

# RAILROAD GAZETTE

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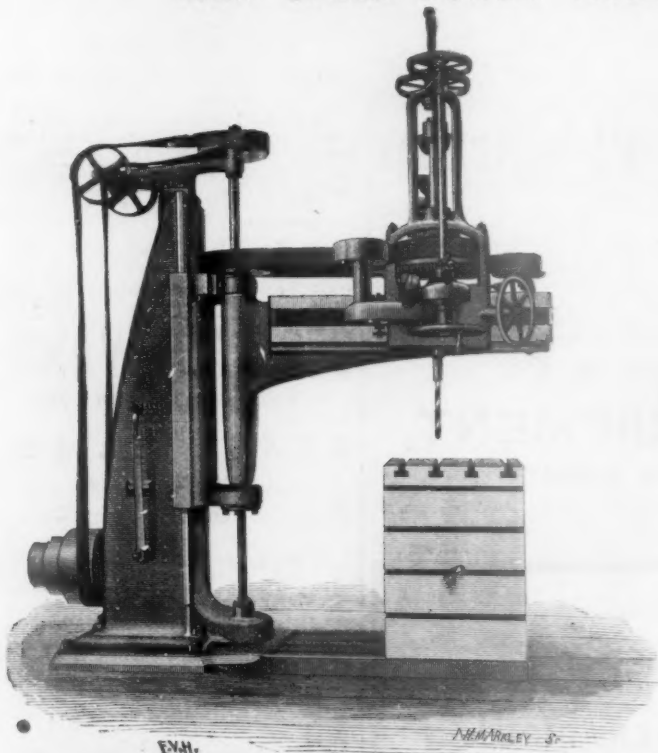
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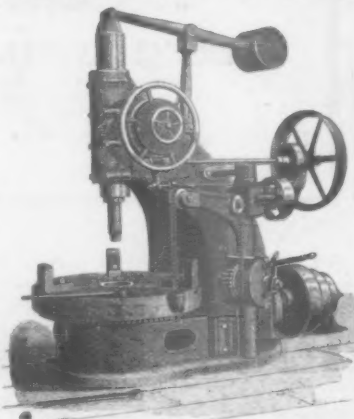
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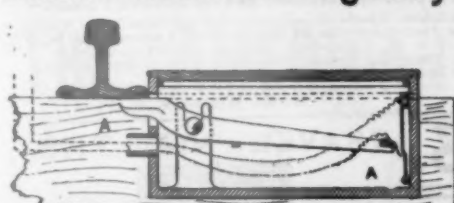
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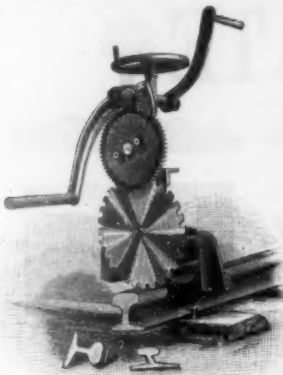
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Butler Drawbar Attach. Co., Cleveland.  
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San Francisco Bridge Co., California.  
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Vulcan Iron Works, Co., Toledo.  
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Billings & Spencer Co., Hartford, Conn.  
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Electric Supply & Mfg. Co., Cleveland, O.  
**Electric Headlights**  
Nat. Elect. Headlight Co., Indianapolis.  
Thomson-Houston Motor Co., Boston.  
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Northampton Emery W. Co., Leeds, Mass.  
H. A. Rogers, 19 John street, N. Y.  
Springfield Emery W. Mfg. Co., Bridge-  
port, Conn.  
**Tanite Co., Stroudsburg, Pa.**  
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C. P. Ketcham & Co., 27 Nassau St., N. Y.  
Keuffel & Esser, New York City.  
Queen & Co., Philadelphia, Pa.  
Young & Sons, Philadelphia, Pa.  
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Industrial Works, Bay City, Mich.  
A. S. Males & Co., Cincinnati, O.  
Marion Steam Shovel Co., Marion, O.  
Osgood Dredge Company, Albany, N. Y.  
J. Southern & Co., Boston, Mass.  
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Vulcan Iron Works Co., Toledo.  
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Bendrock Powd. Co., 23 Park Place, N. Y.  
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Field Water Purifier Co., Chicago.  
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Stow Mfg. Co., Ringhamton, N. Y.  
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New York Equip. Co., 15 Wall St., N. Y.  
**Freight Conveyors**  
Industrial Works, Bay City, Mich.  
**Forges**  
Buffalo Forge Co., Buffalo, N. Y.  
The Fom Mfg. Co., Springfield, O.  
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Allentown Rolling Mill, Allentown, Pa.  
American Supply Co., Kansas City, Mo.  
Cleveland (O.) Frog & Crossing Co.  
Elliott Frog & Sw. Co., E. St. Louis, Ill.  
Johnston R. R. Frog & Switch Co., Phila.  
Pennsylvania Steel Co., Steelton, Pa.  
Ramapo Iron Works, Elliburn, N. Y.  
Union Switch & Signal Co., Pittsburgh.  
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Byram & Co., Detroit, Mich.  
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Industrial Works, Bay City, Mich.  
Lidgerwood Mfg. Co., 96 Liberty St., N. Y.  
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Vulcan Iron Works, Chicago.  
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Walton & Stillman, 210 E. 43d St., N. Y.  
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hem, Pa.  
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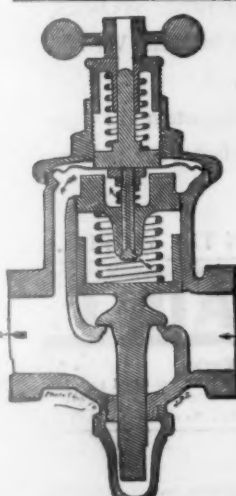
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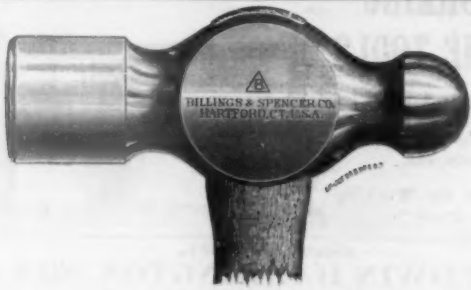
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 N. Y. Equipment Co., 15 Wall St., N.Y.  
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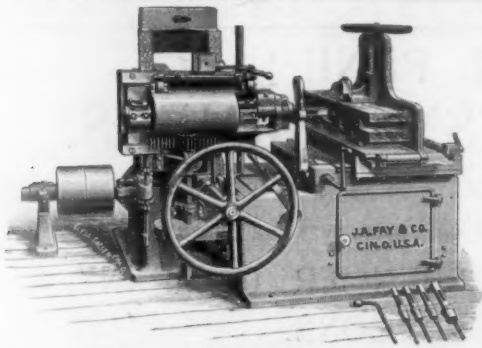
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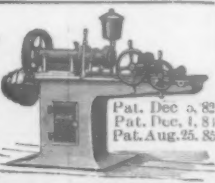
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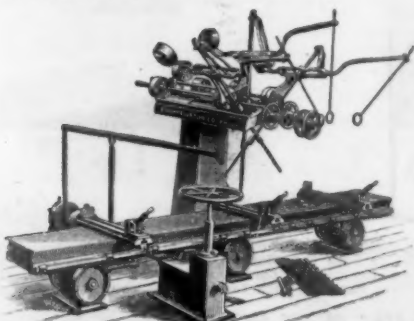
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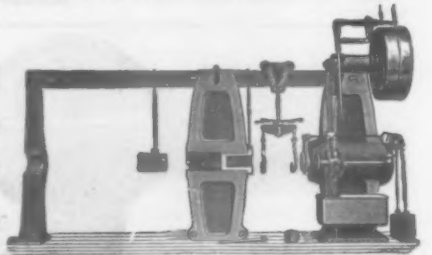
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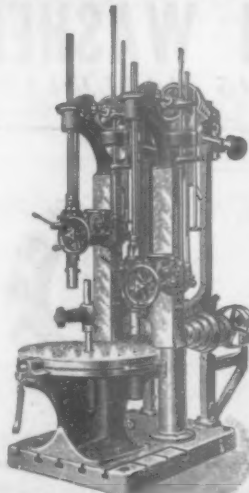
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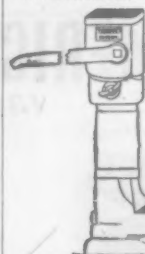
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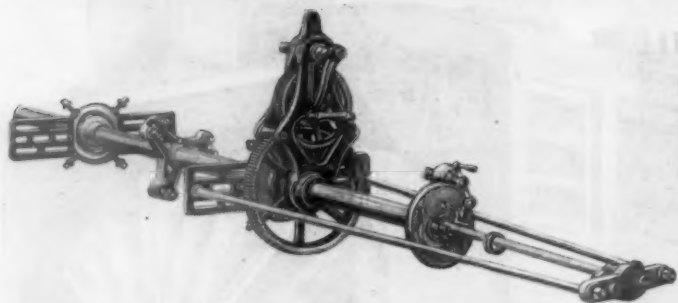
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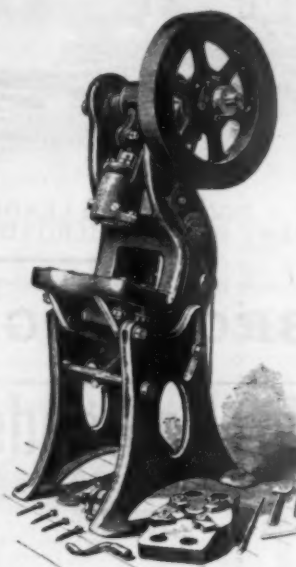


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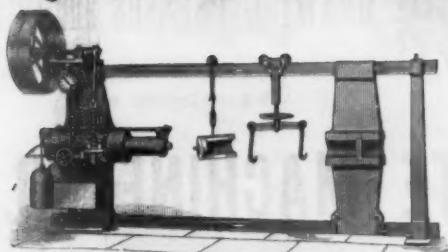
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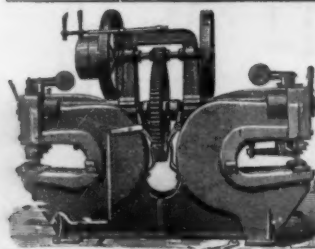
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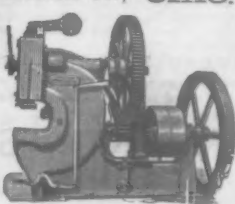
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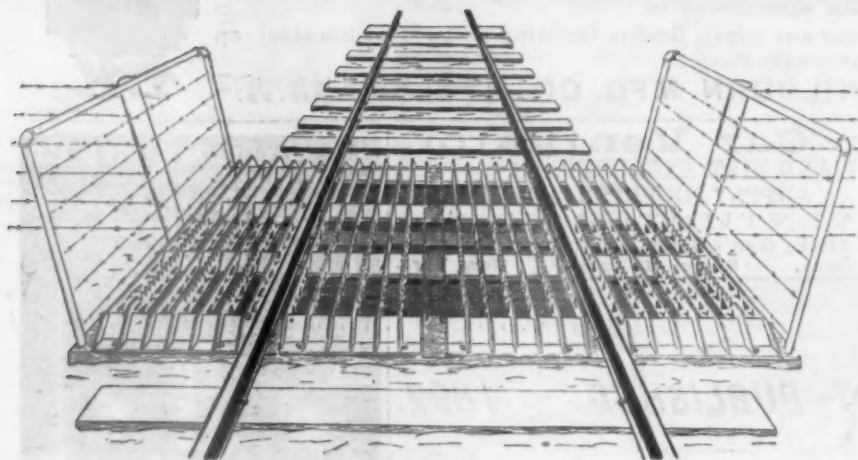


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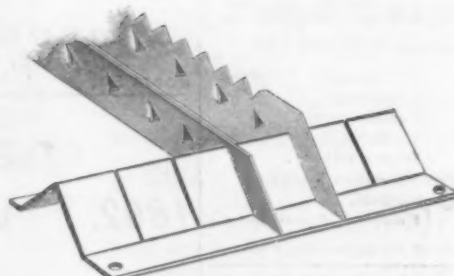


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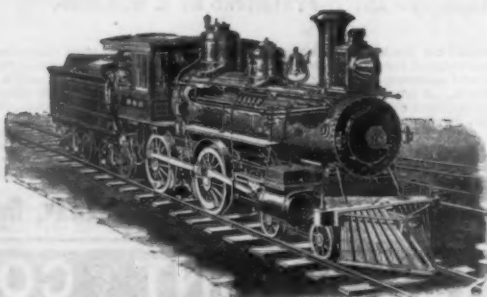
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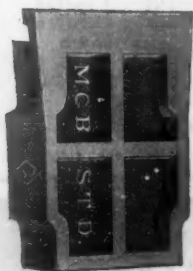
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## STANDARD.

### 10,676 Couplers.

Date.	Drawheads.	Knuckles.
September, 1890,	- 5	49
October, "	- 8	81
November, "	- 43	147
December, "	- 30	131
January, 1891,	- 22	116
February, "	- 66	122
March, "	- 63	172
April, "	- 31	176
May, "	- 13	100
June, "	- 28	110
July, "	- 13	72
August, "	- 19	104
September, "	- 21	73
October, "	- 18	112
Total,	- 422	1,363

### PERCENTAGE OF BREAKAGES FOR ONE YEAR.

Drawheads,	- - -	3 <sup>39</sup> <sub>100</sub>
Knuckles,	- - -	12 <sup>54</sup> <sub>100</sub>

### LIFE.

Drawheads,	- - -	30 years.
Knuckles,	- - -	8 "

## The Standard Car Coupling Co.

Will contract with any railroad company to equip 1,000 or more cars at low prices, and will agree to maintain them for

**\$650 PER THOUSAND CARS.**

## Compare the Following:

### 10,000 Couplers.

Date.	Drawheads.	Knuckles.
September, 1890	- - 174	138
October, "	- - 147	311
November, "	- - 274	492
December, "	- - 233	508
January, 1891	- - 232	382
February, "	- - 271	484
March, "	- - 249	638
April, "	- - 223	322
May, "	- - 216	360
June, "	- - 227	311
July, "	- - 231	434
August, "	- - 232	433
Total,	- - 2,781	3,433

### PERCENTAGE OF BREAKAGES FOR ONE YEAR.

Drawheads,	- - -	27 <sup>81</sup> <sub>100</sub>
Knuckles,	- - -	54 <sup>55</sup> <sub>100</sub>

### LIFE.

Drawheads,	- - -	3 yrs. 6 mos.
Knuckles,	- - -	1 " 9 "

Should seventy-five per cent. of above breakages be replaced without charge, and twenty-five per cent. at, say **\$9.20** each for drawheads, and **\$2.80** for knuckles, the cost of maintenance would be about **\$2.04** per car per annum, and would cost, exclusive of locks, etc.

**\$2,040 PER THOUSAND CARS.**

The number of breakages of the Standard knuckles per month for the last four months has decreased to less than 70 per cent. of that for the previous eight months. The breakage of drawheads has been reduced to about 40 per cent. of that for the previous eight months.

We have the official records of the Standard Coupler on several roads, are preparing them for publication, and will do so as soon as completed.

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We can, therefore, safely challenge comparisons with other rail-circuit systems, being confident that no better records can be shown, or as good.

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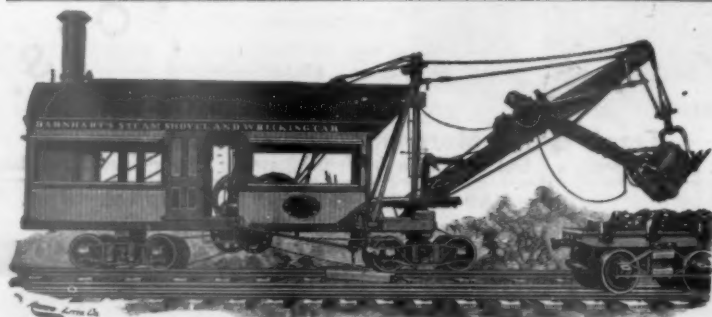
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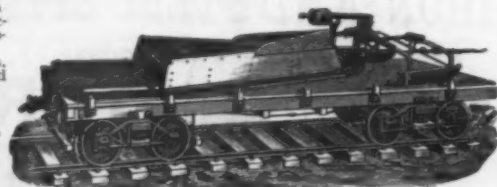
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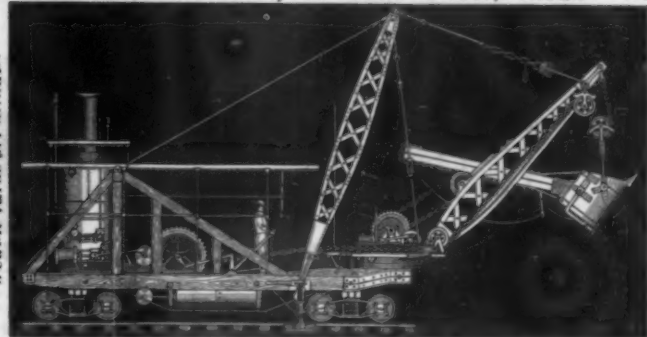
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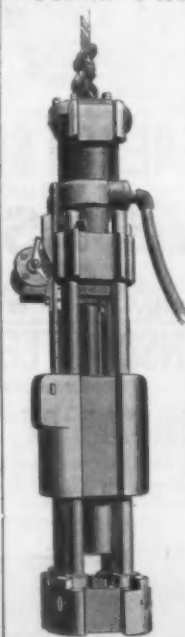
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Yours respectfully,  
LEON BRIDGE CO.,  
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CHICAGO: GENTLEMEN: The No. 2 Vulcan Steam Hammer I purchased of you some three months ago has given perfect satisfaction. I have just finished driving some 39 piles in quicksand, with the best of success, driving a great many of them as deep as 28 ft. in the sand. I have also used the Steam Hammer purchased of you by the Pan Handle Construction Co., while in the employ of the Fort Worth & Denver Railroad, for over three years, and have used it in all kinds of soil, getting from 10 to 14 ft. more of a drive than could be had with the old style of drop hammer. Yours truly,  
E. J. WILCOX,  
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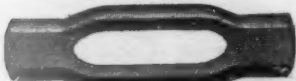
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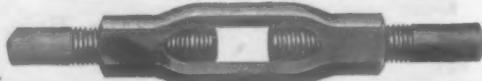
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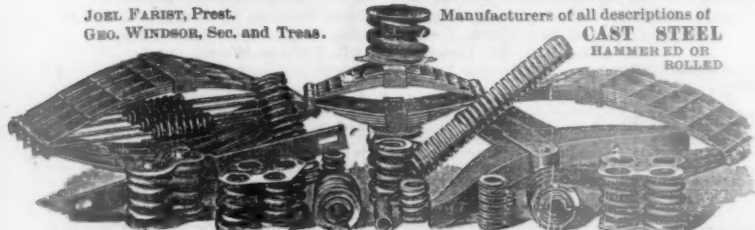
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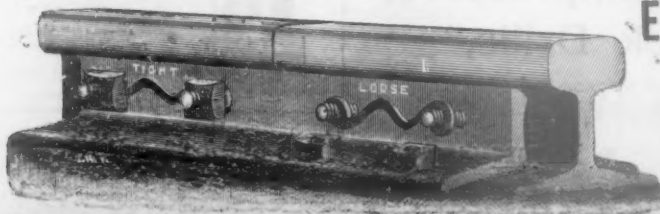
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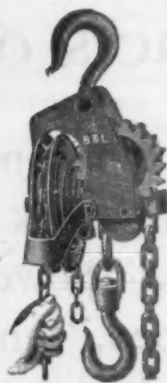
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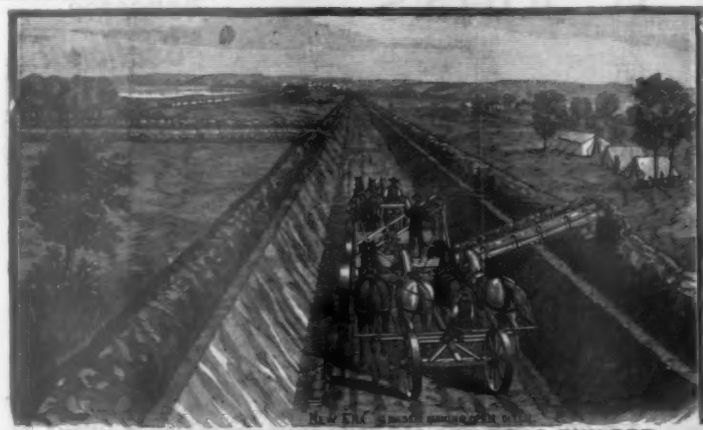
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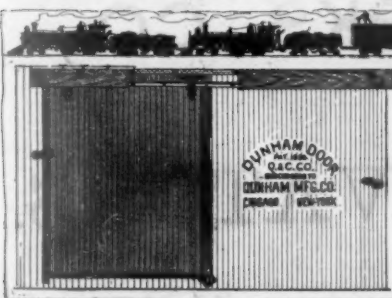
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FRIDAY, JAN. 22.

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## Contributions.

## Contrast Between the Block and the Time Interval Systems.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The recent heavy loss of life on the New York Central, caused by a rear collision, once more calls attention to the fact that this is an age of progress, and that railroad managers must keep in the front rank of the procession. Methods of handling trains in vogue 15 or 20 years ago, when the speed of trains was much slower and the traffic a great deal lighter, will not handle trains of to-day with the increased speed and heavy business. Men who are keeping up with the times see the necessity of keeping trains apart, and look to the block system to prevent tail-enders.

In view of the foregoing facts, it may be of interest to your readers to know the result of blocking trains on one of the great roads of the West. Three years ago this road suffered from a number of serious rear collisions on its eastern division where the traffic was very heavy, and its officers decided that the time had come when old methods of handling trains must give way to new ones, to meet the changing conditions. Rules were formulated and signals erected, and the eastern end of the division divided into blocks from  $\frac{1}{2}$  mile to two miles in length according to the conditions. This block system covered 34 miles of road. On 30 miles of it trains were blocked absolutely, except when permitted to move under a cautionary signal by an order from the train dispatcher; on the other four miles permissive blocking was practiced all the time. The results obtained show what can be done in the way of handling trains safely under an absolute system. During the time this block system has been in use, nearly three years, approximately 200,000 trains have passed over the 30-mile section, in all kinds of weather and under all conditions, without the paint being scratched on the rear end of a train. Previous to adopting this system, an average of one rear collision a month occurred. On the four mile section, under the permissive system, during the same time, three rear end accidents occurred, with loss of life in two of them. This record speaks for itself. A.

## Stresses in Locomotive Tires.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I notice in the *Engineer*, London, Oct. 23, a curious editorial regarding high speeds. The writer is evidently skeptical of everything that appears in an American technical paper, but queerly believes such ridiculous statements as that made regarding the velocity of the Gould train in the vicinity of Chicago.

Among other statements made by the *Engineer* is a remarkable one regarding the stress in locomotive tires at high speeds. The fact is that what is a comparatively high speed for a locomotive along the track is a comparatively low speed for a wheel with a steel rim on it, such as a locomotive tire. The *Engineer* finds a tension in the tire, caused by the centrifugal force, of 3,520 lbs., and states this to be greater than is ordinarily found in tires. Out of curiosity I have made some calculations showing what is the stress produced in locomotive tires when they are shrunk on the centres, as is commonly done in this country. In making these calculations I have assumed that the rim and spokes of the driving wheel are in compression, while the tire is in tension. The following are the dimensions and areas of the driving wheel considered:

Area of section of tire  $2\frac{1}{2}$  in.  $\times$   $5\frac{1}{2}$  in., 13.75 sq. in. Area of section of rim cast iron wheel, 13.7 sq. in. Mean sectional area of each individual spoke, 8 sq. in. Number of spokes, 14. Modulus of elasticity of hard cast iron, 17,000,000. Modulus of elasticity of tire, 32,000,000.

The following are the assumptions upon which the investigation is based: The work done in stretching the tire is equal to the work done in compressing the centre. Assuming for large wheels that the length of the rim is the same as the length of the tire, they may be taken as bodies of the same length, the contraction of one being resisted by the other. If the wheels have an even number of spokes, we may consider two spokes diametrically opposite as being one continuous spoke the length of the diameter of the wheel.

The spokes lengthwise are compressed  $\frac{1}{\pi}$  times as much as the rim, and being but  $\frac{1}{\pi}$  times as long, each square inch of area of the double spoke opposes the same resistance to the shrinkage of the tire as each square inch section of the rim. Hence, so far as the resistance of the centre is concerned, the entire area of section of rim and double spoke may be considered as rim area, or as spoke area, provided that when it is considered as rim area the length of the rim as a circumference is taken as the length of the body compressed, or when a spoke area the length of the double spoke as a diameter is taken as the length of the body compressed.

If  $S$  be the shrinkage of the tire in feet per foot of diameter, as allotted by the Master Mechanics' rule, and  $D$  be the diameter of the wheel, the following equations result:

$\pi S D$  = the decrease in circumference of the tire allowed for shrinkage.

Area of seven double spokes equal 56 sq. in. Add area of rim, 13.7 sq. in., and the total area to be compressed is 69.7 sq. in. for the wheel centre.

The stretching of the tire and the compression of the rim of the wheel is inversely proportional to the product of their respective areas and their moduli of elasticity.

These products are 1,185 for the centre and 440 for the tire as comparative numbers after cancellation.

Dividing the decrease in circumference for shrinkage, as above mentioned, into two parts in proportion to the comparative numbers just found, we find the strength of the tire to be  $.73 \pi S D$  = extension of tire in feet.

The stress in the tire per square inch equals the extension in feet divided by the length in feet and multiplied by the modulus of elasticity, or  $\frac{.73 \pi S D}{\pi D} \times 32,000,000$ .

After cancellation this becomes  $.73 S 32,000,000$ .

As  $S$  equals .01 divided by 12, or .00083, according to the Master Mechanics' rule, the result is 19,300 lbs. per square inch as the stress in the tire produced by shrinkage on any cast wheel where the proportion of the area of cast iron in the rim and the spokes to the area of steel in the rim is the same as in the wheel assumed in the foregoing, provided that the length of the rim be considered the same as the length of the tire and the mean area of the spoke is taken not to include the large central hub of the wheel.

Of course, it makes a difference whether the tire is shrunk on after the axle is placed in the wheel fit or before. Evidently the tension in the tire is much greater when the axle is in position than when it is not, unless it be that the hub has sufficient area to transmit the compression stress around the axle fit hole.

From this it will be seen that the *Engineer* fails to take into account the stress in the tire produced by shrinkage.

Now, a most interesting deduction from this examination is the effect of an applied force, such as that produced by the centrifugal tendency of a tire at speed. Let us suppose the centrifugal force per square inch of section to be that assumed by the *Engineer*, namely, 3,520 lbs. We now have this in addition to the shrinkage stress; what we seek is the resultant effect in the section of the tire, believing that it is not correct to add to the tension already existing in the tire, due to shrinkage, the amount of the applied tension due to the centrifugal force.

When the tire is shrunk on let the pressure between the tire and the centre be  $W$  and the compression of the centre and extension of the tire under a unit load be  $C$  and  $T$ . Let  $X$  equal the increased extension of the tire caused by the application of the centrifugal force. Let  $W'$  equal the increased pressure on the tire brought about by the centrifugal force. We now have the following formula based on this principle; namely, the outward pressure of the centre against the tire plus the centrifugal tendency is equal to the tension in the tire. The formula then is:

$$\frac{WC - X}{C} + W' = \frac{WT + X}{T}. \text{ From this}$$

$$X = W' \frac{CT}{C + T}$$

This is the additional strain in the tire due to the application of the centrifugal force. The stress in the tire, therefore, is  $\frac{X}{T}$  or  $W' \frac{C}{C + T}$ .

Substituting the values of the various quantities, the additional stress in the tire is found to be:

$$\frac{3520}{440 + 1185} = 953 \text{ lbs. per sq. in.}$$

Hence, the resultant effect of the centrifugal tendency, which would under normal conditions increase the tension in the tire 3,520 lbs. per sq. in., as calculated by the *Engineer*, is reduced in point of fact by reason of the initial tension in the tire to 953 lbs. per sq. in.

I offer these calculations with some hesitancy, as I believe it is the first time they have been made, and, therefore, they have not been subjected to the criticisms of the public, as many other formulas have which take into consideration rather complex forms of bodies and the elasticity of materials. Generally the first appearance of a formula of this sort is a signal for attack. I hope that some of your readers will give me the benefit of their criticism.

CENTRIFUGAL.

## The Life of Railroad Ties in France.

In 1868 the Paris, Lyons & Mediterranean Railroad began keeping a systematic record of the ties laid upon and removed from its track. On the first of January that year it was estimated that there were about 6,280,000 ties down, of which 392,000 were renewed during the year. These numbers were increased to 15,254,000 on January 1, 1890, with 715,462 renewed during the year, or a reduction of from 6.2 per cent. to 4.6 per cent. of the total number down. In 1879 it was determined that the average life was 10.4 years; in 1890 it had risen to 12 years, giving an average for the decade of 10.5 years. The greater life at the end is due to the following causes:

1. Decrease in rail renewals by use of steel instead of iron.
2. Decrease in the mileage of track laid with iron rails. Iron rails are laid with a supported joint, and other statistics are supposed to have shown that the wear is from 10 to 12 per cent. higher with this than with the suspended joint.
3. Greater thoroughness of inspection.
4. The substitution of creosote for the sulphates in the injection of the beech ties which constitute about one-half those in use.

Taking the statistics as presented for the years 1880 to 1890 inclusive by the six great railroads, we have the following figures as the average life of the ties:

Western.....	13.8 years.
Northern.....	13.3 "
Orleans.....	13.1 "
Paris, Lyons & Mediterranean.....	11.3 "
Eastern (B).....	12.9 "
Southern.....	8.9 "

Since 1886 the Eastern Railroad has kept no record of the ties removed from the main line, but since 1888 it has taken account of the dated spikes removed from discarded ties before selling them as old wood. The low figures given by the Southern road are due to the extensive improvements that have been made of late years and also to the general use of Landes fir injected with the sulphate of copper for ties; for upon the road from Cette to Marseilles via Tarascon, operated by the Paris, Lyons & Mediterranean, there are several sections of steel rail, laid exclusively on ties of the same kind, whose life is from 8 to 9 years, corresponding to the 8.9 years of the Southern road.

These data serve to show that the life of the tie is practically the same whether under the double headed or the T-rail, and that the variation of latitude between the Western and Northern roads makes no difference. The Western is laid, for the most part, with a double head rail weighing 74.6 lbs. per yard, while the Northern uses exclusively a T-rail of 60.5 lbs. per yard. It would seem, then, that if the train service were the same and the rail as rigid that the ties would last longer on the Northern than on the Western lines, or upon the T than the double headed rail.

These results are far from confirming the assertions made at the International Railroad Congress of 1889 that "the wear of ties is far greater under the T-rail than on a road laid with chairs." This variation shows that the comparison was made between double headed rails with suspended joints and the T-rail with supported joints, a difference not due to the type of rail, but to the method of laying it.

Finally, it may be said that the ties under the T-rails of the Orleans and State railroads are not injected with metallic salts, which lessen the wear of the tie and lengthen its life.

## The Weehawken Viaduct and Passenger Elevators.

BY GEORGE H. BLAKELY.

(With an inset.)

For years the local suburban passenger traffic of the various railroads terminating at the west side of the Hudson River opposite the city of New York has been steadily increasing, and that portion of the State of New Jersey within a radius of 25 or 30 miles from the metropolis has received desirable acquisitions, by the overflow of population from New York, in the shape of the growth of new towns and large additions to the population of the cities already established, while the top of the Palisades, overlooking the metropolis itself, has remained almost undeveloped simply because of its inaccessibility. The highland known as the Palisades stretches northward along the west bank of the Hudson River at an elevation of from 200 to 350 ft. above the river and has an average width of about a mile at the summit. The eastern face rises abruptly from the river and at some places is almost vertical. The top has been accessible only by steep wagon roads and stairways. The upper portion of Jersey City and the towns of West Hoboken, Union, Weehawken and Guttenberg are situated on the southern end of this highland. The North Hudson County Railway Co., which owns and operates all the





ter is held in place, horizontally, by a tenon fitting closely around the inside. The columns are secured to the cast steel bases with wrought iron links, shrunk on pins passing through the column and pedestal, of sufficient section to resist the maximum lifting forces produced by wind and traction.

The bottom of the steel casting is planed as is also the top of the wrought iron base plate. One corner of each tower is anchored against moving, while the other three corners are free to move both transversely and longitudinally upon the sliding surfaces between the cast pedestal and the wrought iron base, but are secured against lifting.

All the struts of the towers are built of four angle irons latted on four sides. The transverse struts have riveted connections, and the longitudinal struts are pin connected. The trusses for the spans are placed 19 ft. centres and are 20 ft. deep, centres of chords. The stringers under each track are spaced 7 ft. centres.

The west span of 180 ft. was made necessary by the un-

Fuertes, Ithaca, N. Y., Charles H. Myers, New York City, Albert B. Hill, New Haven, Conn., John G. Van Horne, New York City, Edmund T. D. Myers, Richmond, Va., James D. Schuyler, San Diego, Cal.; *Secretary*, Francis Collingwood, New York City; *Treasurer*, John Bogart, New York City.

The reports of the various standing committees were made. The report of the Committee on Standard Time was followed by a resolution offered by Dr. Egleston, to the effect that the railroad companies of the United States and Canada be asked to adopt the 24-hour system of notation on the 12th of October, 1892, the 400th anniversary of the discovery of America by Columbus. The preamble to the resolution recited that as this system of notation is of Italian origin it is especially fitting that it should be put into general use on that anniversary. The other standing committees reported progress.

Considerable discussion was had as to the place of holding the next Summer Convention, and a resolution

Weehawken viaduct of the North Hudson County Railway, to the reservoir and high service tower of the Hackensack Water Co., and to the Brooklyn Navy Yard, with a reception at the house of the Society Thursday evening.

#### The New President of the American Society of Civil Engineers.

Mendes Cohen, just elected President of the American Society of Civil Engineers, was born in the city of Baltimore in the year 1831 and is now, therefore, in his 61st year. His education was such as could be obtained at the common schools of his native city, and was terminated when he was 16, by the death of his father, which made it necessary for him to choose his vocation in life and get at once to work. The railroad system was still in its infancy, but being rapidly developed, and railroad affairs seemed to afford a promising field for remunerative employment to men of energy and fitness who might exploit it. This, young Cohen determined to take up as his profession, and in the autumn of 1847 his special preparation began in the locomotive works of Ross Winans, at Baltimore. Here he remained upward of four years, learning in that time the trade of a machinist, acquiring facility as a draughtsman, and becoming thoroughly familiar with the locomotive. While with Mr. Winans he was assigned on several occasions to assist in, or to conduct, experiments on the Philadelphia & Reading, to demonstrate to its officers the superior efficiency of the Baltimore engines, the first successful coal-burning engines used on that road.

Having completed his term with Mr. Winans, Mr. Cohen was appointed by Mr. Benjamin H. Latrobe, its Chief Engineer, to a position in the engineer corps of the Baltimore & Ohio. Here, as principal assistant to the late Benjamin D. Frost (deceased Member Am. Soc. C. E.), then in charge of Broad Tree tunnel, Mr. Cohen was intrusted with the surveys, location and construction of a very interesting piece of temporary road with 6 per cent. grades, and curves of 300 ft. radius across the summit of the ridge then being tunneled, rendered necessary by unforeseen delays in the tunnel, in order that the line might be open to the Ohio River at the promised time. Over this piece of road the entire traffic of the newly opened line was worked for five or six months. The work of construction completed, Mr. Cohen was transferred to the operating department of the road, and given charge of the working of the engines and supervision of the engineers, followed later by duty covering the movement of trains. He was specially assigned to the charge of working the traffic over the temporary line of five per cent. grade, crossing Kingwood tunnel, during the arching of the tunnel, and particularly to the adaptation of the passenger engines of the road, then still wood-burners, to the use of coal. While thus engaged, in the autumn of 1853, Mr. Cohen was offered and accepted the position of Assistant Superintendent of the Hudson River Railroad, where the organization of its roadway and train service devolved upon him, and where his knowledge and experience in the use of coal was of value to the company in assisting in the adaptation of its engines to the use of that fuel.

In the summer of 1861, the breaking out of the war having made many changes in the position and duties of railroad officers, Mr. Cohen was invited to the charge of the Ohio & Mississippi Railroad made vacant by the resignation of George B. McClellan, who at that time re-entered the army. Mr. Cohen resigned his position on the Hudson River Railroad to accept this work. Here he served as Superintendent, and later as President and Superintendent for from two to three years, and here he had a most efficient assistant as Engineer of the road in Mr. Octave Chanute, now the retiring President of the Am. Soc. C. E.

In 1865 and 1866 he was engaged in special service for the Philadelphia & Reading and thereafter spent nearly a year in England. In 1868 he was appointed President's Assistant and Comptroller of the Lehigh Coal & Navigation Co., to which was subsequently added the superintendence of the company's railroads. In this service the very complicated accounts of the corporation, which included departments of mining, canal, railroad and coal sales, were entirely remodeled, simplified and thoroughly systematized. After three years labor in this field, closed by the lease of the company's works to the Central Railroad Company of New Jersey, Mr. Cohen retired, and, having married a few years before, determined to return to his native city, Baltimore, where he has since resided.

In January, 1872, he was made President of the Pittsburgh & Connellsville Railroad Co., and administered the affairs of that corporation until its lease to the Baltimore & Ohio, of which company's lines it now forms the Pittsburgh Division. Upon this he retired from the presidency, remaining as a member of the Board. He has not since taken any active part in professional work.

Mr. Cohen became a member of the American Society of Civil Engineers at the time of its reorganization, December, 1867. He has been a zealous and active member and was elected Director in 1888 and Vice-President in 1890. His services in committees and in the governing board have been valuable and freely given, and were especially notable in the preparation of the new constitution of the Society.



False Work and Travelers—Weehawken

certainty of securing proper abutments on the face of the Palisades, which, though it had the appearance of being solid, was found on closer examination to be seriously cracked, and the length of the span was materially increased in order to reach secure rock. The depth of this span, while it is manifestly far too shallow, was constructed to avoid what was thought, on the part of railroad officers, to be the bad appearance produced by a change in depth of span, as the rest of the structure was kept uniform in depth.

The piers for the towers, with the exception of the two easterly ones, rest upon bed rock. Foundations for these two towers were secured by piles driven to bed rock. The piers are built of concrete, arranged in steps. The concrete is composed in the proportion of 2 barrels German Portland cement, 3 barrels sand, 5 barrels broken stone, and was mixed by hand. A cubic foot of the concrete weighs 140 lbs.

The spans of the viaduct were erected on false work, built accurately to tempt to facilitate handling and re-erection for the spans in advance. In the erection of the spans two travelers were used, one for erecting the trusses and the other following it and swinging the floor beams and stringers into place. All the hoisting of material, both for the ironwork and the falsework, was done by steam. The metal superstructure was manufactured and erected by the Passaic Rolling Mill Co. of Paterson, N. J.

#### Annual Meeting of the American Society of Civil Engineers.

The annual meeting of this Society convened in New York, Wednesday morning of this week. The attendance was considerably less than usual. The following officers were elected: *President*, Mendes Cohen, Baltimore, Md.; *Vice-Presidents* for two years, Samuel Whinery, Cincinnati, O., Charles B. Brush, New York City, *Vice-Presidents* for one year, Samuel M. Gray, Providence, R. I., John MacLeod, Louisville, Ky.; *Directors* for three years, Wm. P. Craighill, Baltimore, Md., Lelfert L. Buck, New York City, Desmond Fitzgerald, Brookline Mass., John Thomson, New York City, Abraham Gottlieb, Chicago, Ill., Benjamin M. Harrod, New Orleans, La.; *Directors* for two years, Theodore N. Ely, Altoona, Pa., George W. McNulty, New York City, Robert Moore, St. Louis, Mo., O. F. Nichols, Brooklyn, N. Y., P. Alex Peterson, Montreal, Canada, Robert L. Read, Cincinnati, O.; *Directors* for one year, Estevan A.

was adopted that it was the sense of the Annual Meeting that Old Point Comfort should be chosen, but the matter was left in the hands of the Board of Direction.

The report of the Board of Direction for the year ending Dec. 31, 1891, showed a total membership of 1,449, and a total connected with the Society, that is including Fellows and subscribers to the building fund, of 1,536. The net increase in membership for the year was 81. The decrease was, deaths 10, resignations 12, dropped 17, transfers 24. The report of the Library Committee stated that an economy of \$729 has been made in the postage account by getting the *Transactions* for the year accepted by the Post Office as second class matter. The cost of the Society publications for the year was \$13,718, from which should be deducted a credit of \$2,770 for subscriptions, sales and advertisements. Two thousand copies of the *Transactions* are printed. The Library Committee recommends a bi-monthly publication of the Proceedings and a quarterly publication of the *Transactions*, for which change in practice there are some excellent reasons. The report of the Treasurer shows disbursements of \$29,792 and a balance on hand of \$5,661.

The President read an invitation to members of the Society to take part in an International Congress on Internal Navigation to meet in Paris next summer. There will be two excursions to the canals of northern, central and southern France. It was suggested that a committee for dissemination of information regarding this Congress be formed. The matter was referred to the Board of Direction with power to act. The President read a circular from the Central Committee on an International Engineering Congress to be held at Chicago during the World's Fair, and explained the organization and present condition of that project. Attention was called to the condition of the subscription of members of the American Society to the necessary fund for the purposes of this Congress. The allotment to the Society is \$3,000, of which a little over \$800 has been subscribed by about 80 members. The opinion was expressed that there would be no difficulty whatever in raising the \$3,000 if another circular is sent out with specific information as to the time of payment, the amount to be raised, etc.

In the evening Mr. Robert Moore, of St. Louis, gave a description with views of the elevated railroad structure in that city, and Mr. George H. Blakeley described the Weehawken elevators and viaduct, which are shown in this issue of the *Railroad Gazette*.

The programme for Thursday included visits to the





ment and control of the city workhouse, the superintendent of which, though appointed by the Mayor, is subject to the orders and instructions of the board. . . . The organization of the new board was completed under the presidency of Col. Henry Flad. With the single exception of the water commissioner, the new commissioners, of whom the writer was one, were without previous experience in the special departments over which they were called to preside; but all were animated by an earnest desire to so organize and conduct the work committed to their charge as to secure the best possible results, and establish the new régime in the confidence of the people. That they were successful is the unanimous verdict. The public works of the city have been managed with economy and skill, and without the slightest suspicion of jobbery. City work is, in fact, as well and as honestly done as that of any private individual or corporation; so that, in cases where an option is given to the property owner to do work, such as sidewalk or alley paving, himself, or have it done by the city

in good faith by the selection of capable and honest men as members of the board, this method of conducting municipal engineering work has several important advantages over the older method which in St. Louis it has superseded.

1. It avoids the absurdity of expecting any one man to be master of all the branches of engineering involved in the public works of the modern city, by subdividing the work to such an extent as to make it possible for the several commissioners to give to the problems of their own special work the concentrated attention and study necessary for their complete solution.

2. By centering in one man the executive control of each department, the highest degree of responsibility and efficiency is promoted.

3. By delegating to the board, composed of the heads of the several departments of public work, the preparation of all ordinances for such work, the city secures the great advantage of the matured judgment of a permanent and responsible body of experts.

the stations on the road being arranged in alphabetical order. Six forms are required to cover all the stations. The time limit can be entered either with a pen and ink or with a stamp. The local round trip ticket is similar to form A. C., the two coupons and the stub being arranged so that one punching fills out all three at once. All the forms are printed on safety paper, the opposite sides of which are colored differently.

The most novel feature of the system is the conductor's check which he gives in exchange for tickets, all tickets being always taken up as soon as presented. This check (form local 8) is similar to a duplex cash-fare check except that the portion to be retained by the conductor has a flap pasted to it in such a way as to form a pocket or receptacle, like an envelope with an open end. Into this pocket the conductor puts the ticket for which the check is exchanged, whether it be large or small, mileage, coupon or whatever it may be; and on the face of the pocket a full description of the ticket must be written out in ink; but this description is made in the auditor's office. The figures on the margin of this conductor's check and "pocket" for punching the train and station numbers are arranged in the same order as on the hat check shown in fig. 3.

Further particulars and interesting points concerning the use of these tickets are given in the following paragraphs, which contain the substance of a letter from the General Passenger Department of the road.

"Our local tickets are printed in six forms, and these cover every point on the line of our road. Agents prefer to use these to the exclusion of all other tickets, but where an agent sells 100 tickets or more a month to any one station, we are prepared at his request to furnish him with a printed destination ticket, form local 1 (fig. 1), as it is more convenient for the accounting department, as well as for the agent, to handle a ticket of this kind to a station where so many tickets are sold. We find,

**GIRARD.**

**Chicago & Alton Railroad**

**Good for ONE CONTINUOUS FIRST CLASS Passage from CARLINVILLE to GIRARD.**

This Ticket is good only on trains that stop at the STATION NAMED ON IT. Freight trains are run for the accommodation of the freight business only, and will not stop at any Station or Platform except where that business makes it necessary to do so.

BAOAGE will not be checked on freight trains.

This Ticket must be presented to Conductor on train on or before the expiration of date punched in margin hereof, after which date it is void, and will not be accepted for passage, but will be taken up by Conductor and regular fare collected.

**NO STOP-OVER ALLOWED ON THIS TICKET.**

1892 1893 1894 1895 1896 1897 1898 1899

FORM Local 1.

*J. H. H. H.*

General Passenger & Ticket Agent.

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC 31 30 29 28 27 26 25 24 23 22

DAY 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

Fig. 1.

at his expense, it is found to be uniformly cheaper and better to have it done by the city.

The full control and responsibility given by the new system to each commissioner over his own department has naturally placed integrity and fitness at a premium in the appointment of subordinates to the disregard of political and other irrelevant considerations. Each has been free to organize and manage his force with an eye single to obtaining the best work, both in quantity and quality, and where this is done success is easy and certain.

Another thing, which has contributed much to the efficiency of the various departments, has been the opportunity of the commissioners to refer doubtful points of policy to the full board for advice and counsel. Backed by the prior indorsement of the board, they are thus enabled to take with safety responsibilities which they could not otherwise do without great danger of misconception, and consequent loss of public confidence. For a public officer must not only do right, but must also be thought to do so by the community whom he serves.

As regards the matters committed to the board as a whole, it may be noted, first of all, that under the new system the letting of contracts for public work is conducted in a manner that leaves nothing to be desired. Every precaution is taken to put all bidders upon an equal footing. The character and quantities of the work are ascertained with the utmost care, and given in advance to all persons interested. All bids must be made upon blanks furnished by the board, and no bid is accepted unless accompanied by a certificate of the city treasurer that earnest money, amounting in some cases to ten per cent of the estimated value of the work, has been deposited with him. At the hour appointed the bids are all opened and read in a public meeting of the board. After a due time in which to canvass the several bids, the award, if any, is made to the lowest bidder, not the lowest and best bidder as under the former charter; but the board may, if it sees fit, reject all bids and order a new letting.

As heretofore carried out, this system of letting public work has given universal satisfaction, without even the slightest suspicion of favoritism or jobbery. That is to say, one of the most fruitful sources of municipal misrule has been completely removed.

In its legislative functions the success of the Board of Public Improvements has been equally pronounced. The ordinances for public work recommended by them have been prepared with great care, so that when sent to the Municipal Assembly they have embodied the results of the best skill and judgment of every member of the board. Where ordinances originating with the board have been rejected by the assembly, it has never been because of any defect of form or method, but because of their unwillingness to do by any method the thing proposed. There can be no doubt that the provision requiring the assembly to pass or reject without amendment bills originating with the board has insured the city against technical blunders which would otherwise certainly have been made, and is eminently wise.

The wisdom of the framers of the St. Louis charter of 1876 has, therefore, been fully vindicated by the test of time, and the general plan of conducting municipal engineering work proposed by them is one which can be recommended without reserve to any large city.

The central ideas of this plan are:

1. The subdivision of the engineering work of the municipality into several departments, under the executive control of one man, who should be a man of strong character and mature judgment, and an expert in the special work under his charge.

2. The creation of a Municipal Engineering Council, or board of experts, composed of the heads of the several engineering departments, co-ordinated under the presidency of an engineer of high rank, to which board all questions concerning the administration of the city works may be referred, and to whose special charge should be committed the letting of all contracts for public work and the initiating of all legislation concerning the same.

Of course it goes without saying that neither this system nor any other will give satisfactory results if committed to the hands of incompetent or corrupt men, although it will do much, even then, to limit the harm which can be done by any one man. But if carried out

4. The opportunity to present all matters of an unusual or doubtful nature to the full board, for record and for advice, in a most valuable resource and protection to the individual commissioner.

5. The placing of all lettings of public work in the hands of the board not only relieves the individual commissioners of work, in which the liability to charges of favoritism and malfeasance are the greatest, but insures the utmost publicity and fairness in the awarding of contracts, thus securing to the city the full benefits of open and honorable competition, and the services of the best class of contractors.

**Chicago & Alton R.R.**

**Good for One Continuous FIRST CLASS PASSAGE FROM NEBO To Station between PUNCH MARKS**

(VIA SHORT LINE.)

This Ticket must be surrendered to Conductor on train, on or before

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after which date it is void, will not be accepted for passage but will be taken up by Conductor, and regular fare collected.

It is good only on trains that stop at the Station named on it.

Freight Trains are run for the accommodation of the Freight Business only, and will not stop at any Station or Platform except where that business makes it necessary to do so.

Baggage will not be checked on Freight Trains.

If more than One Station is designated by Punch Marks as the destination of this ticket, it will be honored only to the station between Punch Marks which is nearest the station at which it is sold.

No Stop-over allowed on this Ticket.

**NOT GOOD UNLESS STAMPED.**

Form A. C.

*J. H. H. H.*

General Passenger & Ticket Agent.

ALMA ALTON ANDERSON ARMSTRONG ASHLAND ATLANTA AUBURN AUXVASSE BALLARD BATES CITY BERDAN BIG BLUE BLACKBURN BLACKSTONE BLOOMINGTON BLUE SPRINGS BOWLING GREEN BOOTH BRACEVILLE BRAIDWOOD BRIGHTON BRIGHTON PARK BROADWELL BRYANS CALLAWAY CAMBRIDGE CARLINVILLE

ALMA ALTON ANDERSON ARMSTRONG ASHLAND ATLANTA AUBURN AUXVASSE BALLARD BATES CITY BERDAN BIG BLUE BLACKBURN BLACKSTONE BLOOMINGTON BLUE SPRINGS BOWLING GREEN BOOTH BRACEVILLE BRAIDWOOD BRIGHTON BRIGHTON PARK BROADWELL BRYANS CALLAWAY CAMBRIDGE CARLINVILLE

Form A. C.

Date of sale

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Fig. 2.

#### LOCAL TICKETS OF THE CHICAGO & ALTON RAILROAD.

In a word, the system is one under which both the officer and the city are protected to the equal advantage of both, and is the best for a large city that has yet been proposed.

#### New Tickets on the Chicago & Alton.

As has been heretofore announced, the Chicago & Alton, on the first of January, put in use an entirely new set of local tickets, making them all limited and limiting them to very short periods. The ordinary limit on single-trip tickets is one day beyond the date of sale. Short-time round-trip tickets are so limited that the return journey must be continuous. We print herewith fac-similes of the one-way tickets and of the conductor's hat check. It will be observed that the distinguishing feature of form A. C. is the provision for filling out the ticket by means of a punch,

however, that agents prefer to use the regular punch tickets regardless of the number which they may sell to any station.

"All tickets are taken up on first presentation. If the ticket taken up reads to a point on the conductor's own run, he issues the usual hat check (fig. 3), which is simply a memorandum for the conductor, and of no value after it is taken up and destroyed by him. If the ticket reads to a point beyond the conductor's run, he issues an exchange train check, form local 8. In issuing this train check the conductor punches the train number, the date of issue and the class; and when the ticket reads to points beyond this road the name of the connecting line to which the passenger is delivered. He also punches by station numbers the station from and to which the passenger's ticket reads. After detaching and handing

**STATION NO.**

Hundreds.	Tens.	Units.
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9

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Fig. 3.

the passenger a check to be presented to the next conductor, the ticket taken up is enclosed in the duplicate or envelope and sent in to the auditor's office for record. A great deal of this punching of the exchange checks can be done before the conductor takes out his train, as he can estimate very closely the number of train checks he will have to issue, and can punch out his train number and the limit on a number of checks.

"The system has been in effect since the first of January, and there have been no complaints on the part of either conductors or agents, which would indicate that it is easily handled."

"In order to facilitate the work of conductors ticket receivers have been placed at our different terminals and at the junctions of conductors' runs. Conductors are obliged to report to these ticket receivers the moment they leave their train and to turn over all cash and the

the doorway. Pulling down on these rods moves a second bell crank at the top in such a way as to compress the face plate spring, and push the face plate outward, as is clearly evident from fig. 1. Hence pulling on the drawbar forces the face plate outward at the top and bottom.

When the drawbar is thrust in a projection on the front follower plate pulls the lower end of the vertical lever by means of the eyebolt shown in fig. 1, and also moves that lever, as before described when the drawbar is pulled out, to the front of the car at the top and towards the centre of the car at the bottom, thus compressing the face plate springs in the same manner as just described. That is, it matters not whether the drawbar is pushed out or in, the face plate springs are compressed.

The parts of this device are made of malleable iron or wrought iron, as may be desired. It is simple and effective.

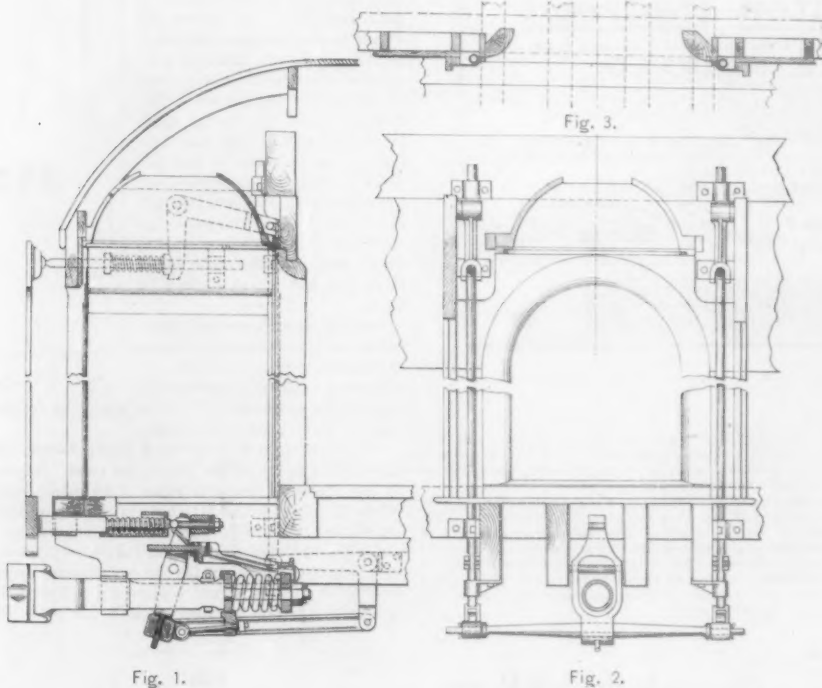


Fig. 1.

Fig. 2.

BUHOUP'S VESTIBULE EQUALIZER.

ticket collections. The ticket receivers make up the collections and the earnings of the train and forward same to the auditor. They are practically bookkeepers for the conductors. They are well posted on all the current instructions to conductors and keep a file of these instructions. They are in a position to instruct conductors on various matters about which the latter would ordinarily write to this office or to the auditor. The ticket receiver keeps a record of the earnings of each train and this is in the hands of the general passenger agent and the auditor on the following day. As far as we have got with the new system we are very much pleased with it."

#### Buhoup's Vestibule Equalizer Device.

Naturally the increased experience with the vestibule has shown the need for changes in the connections between the face plate and the body of the car. We have illustrated the more important of these as they have been brought out and we now give the latest device, which is the invention of Mr. H. C. Buhoup, well known as the Western agent of the McConway & Torley Co. The device, which has decided merit in that the pressure between the face plate at the bottom and the top is increased whenever the cars are pulled apart or pushed together. This is not the case with any other type of vestibule face plate that has been proposed as far as we know. As the result of this feature the cars are steadied on curves whether the drawbars are out or in. The following is a description of the device:

Attached to the regular draught arrangement for a Janney platform there is what is known as a kicker. It is an arm extending back from the rear follower plate to the vertical lever shown in fig. 1, and comes in contact with that lever above its fulcrum. This vertical lever, or yoke, is more clearly shown in fig. 2 at the centre. The drawbar stem passes through the yoke which is at the bottom connected with a cross equalizer, also shown in fig. 2. The equalizer at its end connects with two rods which extend back to a bell crank, clearly shown in fig. 1. It is evident from this construction that whenever the drawbar is pulled out the spring connected to the lower end of the face plate is compressed, and the face plate pushed outward. As the top end of the vertical lever moves outward by the pull of the drawbar so the bottom end of the same lever moves inward, and pushes the lower end of the bell crank toward the centre of the car. This causes the bell crank to pull downward on the two vertical rods, made of pipe, with welded ends, as shown in figs. 1 and 2 and in plan fig. 3 on the side of

the doorway. Pulling down on these rods moves a second bell crank at the top in such a way as to compress the face plate spring, and push the face plate outward, as is clearly evident from fig. 1. Hence pulling on the drawbar forces the face plate outward at the top and bottom.

#### Train Accidents in the United States in December.

##### COLLISIONS.

###### REAR.

1st, about 7 p. m., on New York Central & Hudson River, at Tarrytown, N. Y., a northbound local passenger train was run into at the rear by an express, wrecking the rear car, from which the passengers had all alighted. The rear car crushed the one in front of it quite badly and a few passengers received slight hurts. One passenger in the express train was injured. It appears that the engineman disregarded a fixed signal.

3d, 6 p. m., on New York & New England, at Dorchester, Mass., a westbound local passenger train was run into at the rear by a following passenger train, wrecking the rear car, which was empty. A brakeman was injured.

3d, on Wisconsin Central, at Medina Junction, Wis., a freight train which had stopped at the crossing was run into at the rear by a following freight, wrecking engine and several cars. There was a dense fog at the time, and it is said the flagman did not go back promptly. A man in charge of a carload of potatoes was killed.

3d, on Cleveland, Cincinnati, Chicago & St. Louis, at Fort Wayne, Ind., an eastbound passenger train ran over a misplaced switch and into some cars standing on a siding, injuring the engineer and fireman.

4th, on Chicago & Erie, near Lima, O., an eastbound passenger train ran into a car standing on the main track, badly damaging the engine and express car. Fireman and express messenger injured.

8th, on Chicago & Northwestern, near Merrimac, Wis., a freight train ascending a grade broke in two and the rear part became uncontrollable and ran back some distance into the head of a following freight, wrecking the caboose, engine and a number of cars. The wreck took fire and most of it was burned up. A passenger in the caboose was killed and a fireman injured.

11th, 9 p. m., on the Philadelphia & Reading, at West Manayunk, Pa., a freight train ran into the rear of a preceding freight, wrecking engine, caboose and 10 coal cars. The caboose and 4 cars were burned up. The forward train had been detained by a broken coupling and the flagman had been back with a red signal, but as he was coming in another coupling broke and this seems to have occasioned the collision.

12th, on New York & New England, at Wheatons, Conn., freight train ran over a misplaced switch and into the rear of a preceding freight, wrecking two cars and killing a brakeman. Another brakeman was injured. The engineman was arrested and on Dec. 21 was held on a charge of manslaughter.

12th, on New York, Lake Erie & Western, at Narrowsburg, N. Y., an eastbound freight train standing at the station was run into by a following freight, damaging 4 cars. A westbound train a minute afterward ran into the wreck, blocking the track 5 hours. One engineer was injured.

15th, on Chicago & Alton, near Independence, Mo., a westbound passenger train ran into the rear of a freight which was entering a side track, wrecking an engine

and caboose. One passenger was injured. It is said that the freight was encroaching upon the passenger train's time without proper protection.

15th, on the Lake Shore & Michigan Southern, at Pine, Ind., a freight train standing at the station was run into at the rear by a following freight, injuring the engineer.

While the wreck was being cleared away a third freight came along and ran into the rear of the second one, badly damaging the caboose and injuring a fireman.

16th, on New York Central & Hudson River, near Oneida, N. Y., a westbound freight standing on the main track was run into at the rear by a following freight, wrecking one or two cars and damaging a number of others.

18th, on Missouri Pacific, near Eureka, Mo., eastbound freight train No. 124, which had slacked up at a meeting point, was run into by a following freight, wrecking engine and 15 cars. Engineer and 2 brakemen injured.

19th, night, on Delaware, Lackawanna & Western, at Creston, Pa., a southbound freight train ascending a grade broke in two, and the rear part afterward ran into a following train, making a bad wreck and injuring the engineer. The conductor of a northbound train, riding on his engine, assumed that the detached cars, when he first saw them, were on the same track with himself, and therefore jumped off to escape the expected collision, but he ran directly in front of the runaway cars and was killed.

19th, on Chicago & Erie, near Lima, O., a westbound freight train broke in two and the rear portion afterward ran into the other, wrecking 15 cars and the engine. Fireman and brakeman injured.

19th, 1 a. m., on New York & New England, near Waterbury, Conn., the second section of freight train 64, eastbound, which had been stopped by a preceding train, was run into at the rear by freight train 68, wrecking 2 cars. Engineer injured.

19th, on New York & New England, at Sandy Hook, Conn., a freight train which was standing on a side track, but did not wholly clear the main line, was run into by a following freight, wrecking the caboose and injuring the engineer.

19th, 5 a. m., on Illinois Central, at Wesson, Miss., a freight train was run into at the rear by an empty engine and a brakeman was injured.

20th, on Northern Central, in Baltimore, Md., a southbound passenger train ran into the rear of a freight train which had stopped at a coaling station, wrecking an oil car in the freight train, which at once took fire and exploded. The burning oil was spread over a large area and two other cars of oil were also burned up. The woodwork of the passenger engine was consumed. Three trainmen were injured. It is said that the pressure in the air brake of the passenger engine was too low, a stop having been made but a short time before.

24th, on New York Central & Hudson River Railroad, at Sing Sing, N. Y., a southbound passenger train ran into the rear of a preceding freight in a short tunnel, wrecking a caboose and several cars and blocking both main tracks. The freight was encroaching upon the passenger train's time.

24th, on New York Central & Hudson River, near Hastings, N. Y., northbound express train No. 7 ran into the rear of passenger train No. 45, which had been stopped between stations on account of a blockade of trains due to a collision at Sing Sing, and which was not protected by the rear brakeman. The colliding train was running at considerable speed, and its engine completely wrecked the rear car of the other, killing 13 passengers and 2 trainmen and injuring 5 passengers and 2 trainmen. The brakeman who went back with a red lantern expected a local passenger train and therefore depended on being able to notify the engineer when he should make his regular stop at Hastings; but the local passenger train had been delayed and the express train came ahead of it. This accident was described in the *Railroad Gazette* of Jan. 1.

24th, 8 p. m., on Old Colony Road, at Braintree, Mass., a southbound passenger train was run into at the rear by a following passenger train, injuring 4 passengers.

24th, on the Baltimore & Ohio, near Plymouth, O., a freight train ran into the rear of a preceding freight, making a bad wreck, part of which was burned up. Brakeman and fireman killed.

25th, on Baltimore & Ohio, at Chicago Junction, O., a freight train entering a siding was run into at the rear by a passenger train, wrecking the caboose and derailling several cars. The freight conductor was killed.

28th, 6 a. m., New York Central & Hudson River, near Gasport, N. Y., a freight train broke into four parts while ascending a grade. A following passenger train coupled to the rear portion and started to push it ahead, but before going far ran into the next section, damaging the engine and 6 cars.

28th, on Philadelphia & Reading at Dauberville, Pa., a northbound freight ran into a preceding freight, derailling several cars, which fouled the southbound track. A moment later a coal train came along and ran into the wreck, derailling the engine and several cars and blocking the tracks all night. The wreck took fire and several cars were burned up.

28th, 7 p. m., on West Shore road, near South Bethlehem, N. Y., a freight train broke in two and the two parts afterward came together, wrecking 6 cars. Two brakemen injured.

29th, on Fitchburg road, near Athol, Mass., a freight train ran into the rear of a preceding freight, blocking both tracks and injuring 2 brakemen.

29th, on Southern Pacific, near tunnel No. 9, Oregon, a freight train descending a grade broke in two, and the rear portion afterward ran into the forward one, wrecking several cars. A brakeman was killed.

And 31 others, on 30 roads, involving 4 passenger and 67 other trains.

##### BUTTING.

1st, on Louisville, New Albany & Chicago, near Crawfordsville, Ind., butting collision between freight trains, wrecking both engines and 12 cars. It is said that the conductor of one of the trains misread a telegraphic order. One brakeman was injured.

2d, on Housatonic, at Wilson's Point, Conn., butting collision of switching engines, injuring a conductor.

3d, on Lake Erie & Western, at Lima, O., butting collision between a switching engine and a passenger train, the switcher being on the main track without orders. Two firemen and 2 passengers were injured.

3d, on Chicago, Rock Island & Pacific, at Commerce, Ia., butting collision of freight trains, wrecking several cars. A fireman was injured.

4th, on Seattle, Lake Shore & Eastern, near Snohomish, Wash., a car of a freight train being switched near the top of a grade became uncontrollable and ran out some distance into the head of a mixed train, wrecking the car and badly damaging the engine. Engineer, fireman and conductor injured.



4th, on Atchison, Topeka & Santa Fe, near Brenham, Tex., butting collision between freight trains, injuring an engineer and a fireman.

5th, about 1 a. m., on New Orleans & Northeastern, near New Orleans, La., butting collision between freight trains, one of which was going upon a side track, badly damaging both engines and several cars. One brakeman injured. It appears that the northbound train miscalculated the time necessary to reach the siding and clear the southbound train.

7th, on Kansas City, Fort Scott & Memphis, at West Plains, Mo., a work train running backward collided with a freight, wrecking the caboose and killing 4 laborers. There were 39 men in the caboose, and 20 of them were injured.

10th, on Chesapeake & Ohio, near Alderson, Va., a freight train waiting for a passenger train was started out after the first section of the passenger train, the fact that a second section was to follow having been undiscovered or overlooked. A butting collision resulted, and 3 trainmen were killed. Five other trainmen were injured.

18th, on Philadelphia & Reading, at Lofly, Pa., butting collision of freight trains in a tunnel, wrecking both engines and several cars and killing 4 trainmen. It is said that the eastbound train ran past an appointed meeting place.

19th, 1 a. m., on Chicago, Burlington & Quincy, at Rome, Ia., a westbound passenger train approaching the station ran into the head of a freight train standing on the main track, wrecking both engines, a baggage car and several freight cars. Two trainmen and 3 passengers were injured.

26th, 8 a. m., on Duluth, South Shore & Atlantic, near Humboldt, Mich., butting collision of freight trains, killing 2 trainmen and injuring 2 others.

27th, on Chicago, Burlington & Quincy, at Sandwich, Ill., an eastbound stock train ran over a misplaced switch and into the head of a westbound freight standing on the side track, wrecking both engines and 15 cars. Engineer and fireman injured. It is said that the distant signal connected with the switch was in the danger position after the wreck, though there is good evidence that it was clear when the train passed it.

28th, on Duluth, South Shore & Atlantic, near Champion, Mich., butting collision of freight trains, making a bad wreck and killing 3 trainmen. It is said that an operator failed to hold the eastbound train.

29th, 3 a. m., on Hannibal & St. Joseph, near Chillicothe, Mo., butting collision of freight trains, wrecking 11 cars of cattle. The wreck took fire and many of the animals were burned to death. Four trainmen were killed and 2 others injured. A mistake in orders was reported as the cause.

31st, on Union Pacific, near Graneros, Colo., butting collision between two passenger trains, each of which was drawn by two engines. Engineer killed and 3 trainmen injured. There was a blinding snow storm at the time. It is said that a station agent failed to deliver an order to the northbound train.

And 5 others on 5 roads, involving 1 passenger and 9 other trains.

#### CROSSING AND MISCELLANEOUS.

2d, 6 a. m., on New York Central & Hudson River, near East Albany, N. Y., a southbound express train ran into an empty engine standing on the main track waiting to get through a crossover. Engineer and fireman injured.

3d, about 5 p. m., on Philadelphia & Reading, near Pennington, N. J., a southbound express train, traveling at high speed, ran into the caboose of a gravel train which was just going upon a siding, killing 3 sectionmen and the engineer of the express, and injuring 15 passengers and several employees. The engine of the express was overturned and thrown down an embankment, and the first passenger car was partially overturned.

3d, on Pennsylvania, at Shocks, Pa., a passenger train ran into a freight train which was pulling out of a side track, wrecking the engine and 5 cars.

4th, about 6:30 a. m., on New York & New England, at East Thompson, Conn., an eastbound freight train, traveling on the westbound track, struck a branch freight switching on the main track of the main road, there being a dense fog at the time. The wreck blocked both main tracks, and the eastbound Long Island express (on its regular track) ran into it, killing the engineer and fireman.

This train was followed by the steamboat express, which ran into the rear of it, doing slight damage, but apparently starting the fire in the sleeping cars which burned up a part of the wreck. A passenger in one of the sleeping cars was burned to death. Four employees and another passenger were injured. The fire burned 2 passenger and 4 or more freight cars.

7th, on New York Central & Hudson River, at Clyde, N. Y., a freight engine and a caboose coming out of a side track were struck by a heavy freight train and both engines were wrecked. A fire started from the caboose stove and several cars were burned up. A brakeman was injured. It is said that the engineer of the freight was asleep.

8th, at the crossing of the Chattanooga Southern and the Rome & Decatur, at Gadsden, Ala., a switching engine of the latter ran into a freight train of the former, wrecking 3 cars and injuring 2 trainmen. It is said that the collision was caused by the failure of the Rome & Decatur train to stop before attempting to cross.

9th, at the crossing of the Illinois Central and the Terre Haute & Peoria, at Arcola, Ill., a freight train of the latter ran into a passenger train of the former road, killing the engineer and injuring several passengers.

10th, on Mobile & Ohio, at Mountain Glen, Ill., a collision between a freight train and a work train wrecked several cars and caused the death of 3 trainmen. Nine other employees were badly injured. The flagman of the work train did not properly signal the other train.

10th, at the crossing of the Union Pacific and the Atchison, Topeka & Santa Fe, at Abilene, Kan., collision of freight trains, wrecking 12 cars of cattle and killing a brakeman.

15th, 6 p. m., on New York Central & Hudson River, at Fishkill, N. Y., a northbound express train ran into a switching freight train, making a bad wreck and killing the engineer and fireman of the passenger train. It is said that the station distant signal was properly set to stop the passenger train. Five passengers and 3 trainmen were injured.

17th, night, on Lehigh Valley, at Waverly Junction, N. Y., a collision of freight trains resulted in the death of a fireman.

18th, on Minneapolis & St. Louis, at Albert Lea, Minn., collision of freight trains, killing 2 trainmen.

22d, 2 a. m., on Baltimore & Ohio, at Sir John's Run, W. Va., an eastbound express train struck the side of a freight train, derailing engine and several freight cars. Engineer injured.

22d, on Boston & Albany, at Springfield, Mass., the engine of a switching train ran into some freight cars in the yard, wrecking 1 car and injuring a fireman.

24th, 5 a. m., on Flint & Pere Marquette, at Everts, Mich., a freight train being made up in the yard was run into by another freight train, killing 1 brakeman and injuring 2 others. It is said that the engineer of the approaching freight mistook a hand signal.

28th, on Union Pacific, near Beatrice, Neb., a passenger train ran into a switching engine in the yard, wrecking both engines and derailing 2 baggage cars. Two engineers and 2 firemen injured.

And 17 others on 13 roads, involving 3 passenger and 30 other trains.

#### DERAILMENTS.

##### DEFECTS OF ROAD.

1st, on Pittsburgh & Western, at Chewton, Pa., the engine and 9 cars of a freight train were derailed by a defective switch. A telegraph operator riding on the engine was fatally injured. The engineer and fireman were also hurt.

5th, on Findlay, Fort Wayne & Western, near Ottawa, O., a work train broke through a bridge, and the caboose, containing a large number of workmen, was thrown to the river below. Three employees were killed and 6 injured.

14th, on Rio Grande Junction road, at New Castle, Colo., passenger train No. 2 derailed by a broken rail, several cars being partially overturned. The fireman was fatally injured.

15th, on Atchison, Topeka & Santa Fe, near Brenham, Tex., a passenger train of 6 cars was derailed, and although there were a large number of passengers aboard, only 7 of them were injured. It appears that the rails had been loosened for a considerable distance by the cutting out of the spikes by a derailed freight car in a train which had passed a short time before. This derailed car, after running about 2 miles, was rerailled at a road crossing, so that the injury done by it to the track was not promptly discovered.

16th, on Pittsburgh, Fort Wayne & Chicago, near Lima, O., a westbound express train running about 50 miles an hour was derailed by a broken rail, and the rear portion of the train was thrown against a freight train standing on a side track. The cook of the dining car, fireman and 1 passenger were killed, and 14 passengers and 5 trainmen were injured.

16th, on Great Northern, near Park River, N. Dak., a mixed train was derailed by a broken rail and broke through a bridge, wrecking 1 passenger and 2 freight cars. Six passengers were injured.

17th, 4 a. m., on Atchison, Topeka & Santa Fe, near Cherryvale, Kan., a southbound passenger train was derailed while running at considerable speed and the four rear cars were thrown over an embankment. Fire broke out and the wreck was burned up. Twenty-two passengers were injured, some of them being burned. It is said that the cause of the derailment was a loose rail.

20th, on St. Paul & Duluth, near Stillwater, Minn., a Wisconsin Central passenger train, the engine of which was running tender first, was derailed on or near a trestle by spreading of rails. The engine and cars ran some distance on the sleepers and finally fell about 12 ft., the whole being overturned. There were only 3 passengers on the train, of whom 2 escaped uninjured. Engineer and conductor injured.

24th, on East Tennessee, Virginia & Georgia, near Williams, Ga., passenger train No. 11 derailed in a cut, the cause being, it is said, spreading of the rails. Nine passengers and 4 trainmen were injured.

27th, 6:30 a. m., on Atchison, Topeka & Santa Fe, near Carrollton, Mo., 3 cars of a fast passenger train were derailed by spreading of rails, two of them being overturned and badly wrecked. Ten passengers and 3 trainmen injured.

30th, on East Tennessee, Virginia & Georgia, near Bristol, Tenn., 2 cars of a westbound passenger train derailed by a broken rail, injuring 7 passengers.

And 5 others on 5 roads involving 1 passenger and 4 other trains.

#### DEFECTS OF EQUIPMENT.

5th, on Louisville, New Orleans & Texas, near Evansville, Miss., a northbound passenger train running about 35 miles an hour was derailed by the breaking of a tender truck; and the cars, after running some distance to a trestle, fell about 25 ft. into a bayou. Fourteen passengers and 2 trainmen were injured, but none of the injuries were dangerous. The broken truck stripped off a considerable length of the bridge floor, but the whole train fell off at the side, none of it going through the bridge.

21st, on Boston & Albany, near South Schodack, N. Y., a westbound freight train was derailed by the breaking of a truck and several cars were wrecked. A brakeman was injured.

And 19 others on 14 roads involving 3 passenger and 16 other trains.

#### NEGLECT IN OPERATING.

1st, on Atchison, Topeka & Santa Fe, near Goldthwaite, Tex., freight train derailed by a bale of cotton which fell off a platform car in a cut. The conductor and two men in charge of cattle were injured.

2d, 5 p. m., on New York Central & Hudson River, at Mott Haven, N. Y., the rear car of a northbound passenger train moving about 20 miles an hour was derailed and overturned at the switch connecting the Hudson River with the Harlem division. Two employees of the road walking near the track were struck and killed and a brakeman was slightly injured, but the passengers escaped without injury. It appears that the switch was turned under the train, though there is a detector-bar on the switch.

9th, on Duluth, South Shore & Atlantic, near Marquette, Mich., a freight train ascending a steep grade broke in two and the rear portion ran back some distance to a sharp curve, where the cars were derailed, wrecking a house and injuring 2 of its occupants. Another car and a caboose caught fire in some way, it is said, before they jumped the track, and they, having struck another house, set it on fire. A third house was also ignited and, altogether, three houses were destroyed.

23d, on Kansas City, Memphis & Birmingham, near Quin, Ala., 8 cars of a freight train were derailed by a stone which fell off a platform car in the train. Two brakemen were injured.

24th, on Columbus, Shawnee & Hocking Valley, near Shawnee, O., the engine and 8 cars of a freight train were derailed at a switch, which had not been properly fastened. A brakeman was killed.

And one other, involving 1 freight train.

#### UNFORESEEN OBSTRUCTIONS.

3d, on Chesapeake & Ohio, at Caperton, W. Va., engine and 6 cars of a freight train derailed by a chain

which is said to have been maliciously fastened upon the track.

8th, on Texas & Pacific, near Bayou Gula, La., the engine of a freight train struck a horse and the engine and 2 cars were derailed. The fireman was thrown or jumped out upon the ground and was killed by the shock.

12th, on Newport News & Mississippi Valley, near St. Elmo, Tenn., a freight train ran over a bull and 11 cars were derailed, making a bad wreck. Engineer killed and fireman and brakeman injured.

21st, on Lehigh Valley, at Rockport, Pa., a passenger train was derailed by a landslide and a man riding on the locomotive was killed. The fireman was injured.

22d, on Northern Pacific, near Castle Rock, Wash., engine and 9 cars of a freight train were derailed by a landslide, 2 cars being thrown into a river. Two tramps injured.

30th, on Philadelphia & Reading, at Lansdale, Pa., the engine of a passenger train was derailed at a misplaced switch, which, it is said, had been maliciously unfastened. Engineer and fireman injured.

30th, 5 a. m., on Fitchburg road, at Fitchburg, Mass., a passenger train ran into a landslide, derailing the engine and injuring the engineer and fireman.

And 5 others on 4 roads involving 1 passenger and 4 other trains.

#### UNEXPLAINED.

2d, on Adirondack & St. Lawrence, at Remsen, N. Y., a work train was derailed and 2 trainmen were injured.

3d, on Columbia & Puget Sound, at Black Diamond, Wash., 10 coal cars and a passenger car attached to a freight train were derailed and thrown over a bank. Twelve passengers were injured.

4th, on Union Pacific, near Harold, Tex., the caboose of a freight train was derailed and overturned, injuring the conductor.

10th, on New York Central & Hudson River, near 100th street, New York City, on the Fourth avenue line, a car in a freight train was derailed, blocking two main tracks several hours.

14th, on Atchison, Topeka & Santa Fe, near Paul's Valley, Tex., a passenger car was derailed and one car rolled down a steep embankment, injuring several passengers.

15th, on Chicago, Burlington & Quincy, at Dudley, Ia., a freight train was derailed and 17 cars wrecked. Engineer and fireman killed.

20th, on Atchison, Topeka & Santa Fe, near Ardmore, Tex., northbound passenger train No. 10 derailed and the engineer and fireman injured.

21st, on Dutchess County Railroad, near Poughkeepsie, N. Y., a work train was derailed and 6 laborers were injured.

2'd, on Baltimore & Ohio, at Franklin, O., freight train No. 92 derailed. Two tramps killed.

24th, on New Orleans & Northeastern, at Pachuta, Miss., a wrecking train was derailed, 1 car being thrown upon the engine and crushed, causing the serious injury of 6 employees, one of them being badly burned by the caboose stove.

27th, on Atchison, Topeka & Santa Fe, near Newcombe, Mo., westbound freight train derailed, 3 cars being thrown down an embankment. Ten passengers and 4 trainmen injured. It is said that the track was found to be in good condition.

29th, 9 p. m., on Union Pacific, near La Grande, Or., westbound passenger train No. 1, drawn by two engines, was derailed, the engines being overturned and the first 2 cars considerably damaged. Two trainmen and 2 tramps were killed. The State Railroad Commissioners hold the company chargeable with negligence in using for a passenger train engines of the weight and character of those used at the time of the wreck, where sharp curves abound and where the schedule time is fast.

29th, on Burlington & Missouri River, near Culbertson, Neb., a work train was derailed and 3 laborers injured.

30th, on Pittsburgh, Fort Wayne & Chicago, near Salem, O., freight train derailed, 18 cars being wrecked. Engineer and fireman fatally injured and a brakeman seriously hurt.

And 32 others on 28 roads involving 6 passenger and 26 other trains.

#### OTHER ACCIDENTS.

22d, off Pennsylvania, near Glenock, Pa., the engine of a freight train struck a coal chute which had been left hanging too low and the cab was knocked off. The fireman was badly injured.

23d, on Cumberland Valley road, near Martinsburg, W. Va., a passenger train running at considerable speed ran upon a mass of stone piled upon the track, tearing off the brake rigging from several cars.

And 6 others on 6 roads involving 6 passenger trains.

A summary will be found in another column.

#### New York Railroad Commissioners' Report.

The ninth annual report of this board, dated Jan. 11, 1892, and containing statistics for the year ending June 30, 1891, has just been sent to the Legislature, although the second volume, containing the reports of the railroad companies, is not yet printed. The report begins with a review of the general situation, not only in New York, but the country as a whole. It is believed that "of late years the wide discussion of the railroad problem, so-called, together with state and national supervision, has led to a better understanding of the relation of railroads to each other and to the public, and of the public to railroads. There appears to be less disposition upon the part of these corporations to disregard their obligations to the public, and less disposition upon the part of legislatures, particularly in the Eastern States, to engage in hasty legislation. . . . The idea is gaining ground rapidly that a railroad should not be permitted to be built without a declaration on the part of the state that there is a public necessity for it;" and the Commissioners, after supporting this view by some argument, state that they will submit a bill for enforcing it by law.

The Commissioners regret that a uniform freight classification for the country has not yet been adopted. But they seem to be aware, nevertheless, that such a change would probably do as much harm as good. A summary is given of the action of the convention of State Railroad Commissioners on national legislation concerning safety appliances. It is stated that the committee, of which Commissioner Rogers, of New York, is one, has

not yet decided upon the form of a measure to be recommended to Congress.

The number of miles of road in New York State on June 30 was 7,651, an increase of 61 miles during the year. The other statistics are of slight value, as they include the whole of the operations on such roads as the Boston & Albany and the Lake Shore & Michigan Southern, whose lines are mostly outside of New York State.

The accident statistics are for the year ending Sept. 30, 1891. They are probably for New York State alone, although there is nothing in the table to indicate that they do not, like the other figures, cover the whole of the roads reporting. Thirty-three passengers, 278 employes and 409 other persons were killed; and 141 passengers, 1,222 employes and 365 others were injured. Of the passengers, 15 deaths and 73 injuries are charged to causes beyond their own control, which appears to include all those killed or injured in train accidents. Of the 15 passengers killed, 12 were victims of the Montezuma collision, Aug. 6, and 3 of the butting collision at Champlain, Aug. 5. Fourteen employes were killed by the explosion of dynamite near Tarrytown, May 19. Eighteen employes were killed and 648 injured while coupling or uncoupling cars, a decrease in the number of killed and an increase in the number of injured as compared with the previous year. Speaking of the per-

sons, however, that the work of the Revision Commission is still in an unfinished state, and some of its incomplete work remains to be amended or completed by the legislature now sitting. The value of the work of this Revision Committee would seem to be much impaired by the narrow scope of the plan, numerous errors of a clerical nature in previously existing laws being reproduced in the new draft, evidently because the Commission had not the authority to make a change in such cases. The Commissioners last year refrained from proposing new laws, because they expected that the Revision Commission would be hampered thereby, but they propose this year to present drafts of bills as follows:

*First.* An act with regard to grade crossings, including: (1) To prevent railroads hereafter constructed from crossing highways at grade, except by permission of the Supreme Court in special cases; (2) To prevent new highways being opened over railroads at grade, except by permission of the Supreme Court in special cases; (3) To provide for the separation of grades between railroads and highways at present grade crossings. *Second.* An act to prohibit street railroads hereafter laying centre-bearing rails, etc. *Third.* An act to prevent the unnecessary duplication of railroads. *Fourth.* An act to regulate the transportation of dynamite and other explosives.

#### Gold's Improved Pressure Regulator.

Figs. 1 and 2 show a section and external view of the improved pressure regulator devised by the Gold Car

#### A Brief Summary of the Elevated Railroad Cases in New York.

(Continued from page 41.)

BY J. S. WOOD, ESQ.

The question of leased property has also arisen, and has, by a course of ingenious reasoning, been upheld against the railroad companies. In case that a little more than six years prior to the commencement of an action an owner leased his entire property for a term of years, can the owner recover rental loss or damage for the period leased? His rental is not affected by the railroad, and what damages may be said to suffer? If the road was removed his rent would be the same until the expiration of the lease; and if he has a cause of action at all it is barred by the statute of limitations, since it accrued at the time of making the lease, which is concededly without the period of six years. The courts, however, took the position that in determining the rents at the time of making the lease the landlord allowed a lower rent, because of the anticipated continuance of the railroad, and could recover the difference between what he actually got each year and what he ought to have got during the six years, the trespass being in its nature continuous and from year to year.

An old rule of law in this state established the doctrine that one in possession of the premises can alone bring an action for trespass. Ordinarily a tenant alone can bring the action for trespass to his estate. It was plausibly contended by the railroad that the landlord out of possession should be restricted to his action in equity for an injunction, etc., but the courts have held that the landlord may recover his past damages whether in possession or out of it. In the Mortimer case (29 St. R., 262) the court adopted the theory that the landlord must recover because he only leased to the tenant what he had, and as he had been deprived of the easements of light, air, etc., he alone should sue for damages. As to the question who shall recover between a lessee subsequent to the railway and a landlord, the Kernochan case in the Court of Appeals has decided that the subsequent lessee cannot recover. But in case of a long lease, say of 99 years, in which a lessee covenants to build, the railway would really appear to injure the lessee under the Pappenheim theory, since as in that case the *injuria* must be supposed to arise *de die ad diem* and *de novo*. If it so arises to the fee owner, why not to the term or who has his term carved out of the fee?

The Kernochan and Pappenheim (Court of Appeals) theories are difficult to harmonize. Nevertheless, the courts are probably correct in awarding the damages, if any, to the fee owners only, and, as in the Bach case, requiring all persons necessary to give a good title, to be made parties, such as remainder men, etc. The Kearney case (Court of Appeals), however, seems to favor the awarding of damages to the prior lessee (*i. e.*, on a lease instituted before the building of the railway), and in case the prior lessee has built upon the leased premises.

The date at which the damages shall be assessed (as to future or permanent damages) is determined in the Kenkele case (29 N. Y., St. R., 95) to be the time of trial. The hardship of this decision to the railroad lies in the fact that owners of lots lying at the northern end of the line which because of the advantageous railroad facilities have subsequently been built upon, can recover for the injuries done their buildings, under the Kane case and Drucker case, by reason of the smoke, cinders and noise of the railroad. So determined are the courts to "punish" the railroad!

The Tallman case held that the property owner can recover the damage done his land in the use to which it is put, but he can't recover past damages to vacant lots assessed on the theory that but for the road he would have built on them. The Newman case (118 N. Y., 618), decided that the railroad company was entitled to offset against the damage any benefit conferred by the maintenance of the road and the stations, excepting the general benefit enjoyed by the public at large. The question of "increased accessibility" by reason of a station is now before the Court of Appeals in the Somers case.

The true rule of damages seems to be as stated by Judge Van Brunt in the Kenkele case, which has been affirmed by the Court of Appeals. Judge Van Brunt says (29 N. Y. St. R., p. 96): "How are we to arrive at the value of these easements taken by the defendant? To the plaintiff they are of no value, except because of the enhanced value which they give to the property they own fronting on the street. By themselves they are worthless, have no intrinsic value. Then what more certain evidence of their value can be given than by proof of what the property to which they are appurtenant would now be worth with the easements, and what it is worth without these easements. . . . What damage is the owner . . . entitled to? Clearly the amount by which his property is at the time of trial injured by the trespass. The trial is the time at which the computation should be made and the damages fixed."

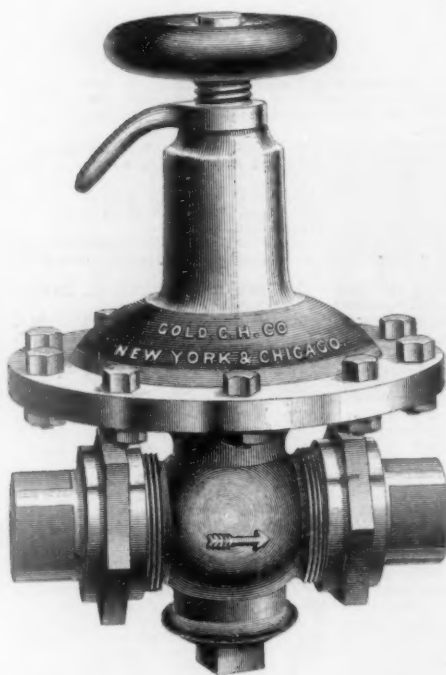


Fig. 1.

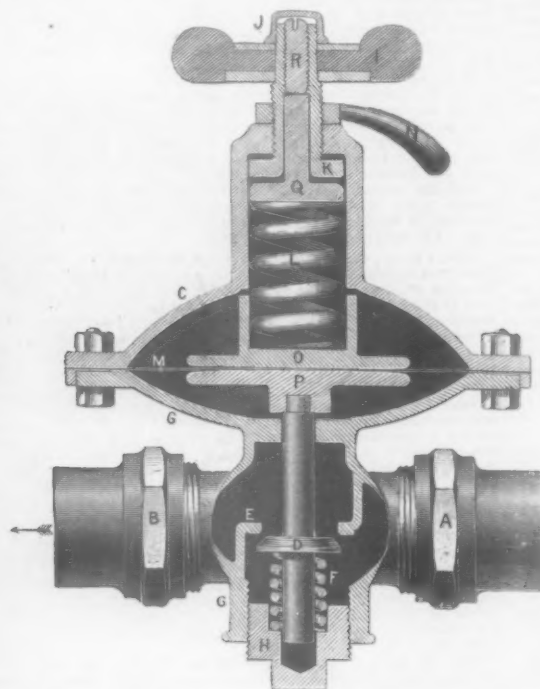


Fig. 2.

#### GOLD'S IMPROVED PRESSURE REGULATOR.

sons killed while walking on the track the Commissioners say: "There does not appear to be a public sentiment in this country against people walking on the railroad tracks. Until it develops these casualties will continue."

The action of the Board in connection with the Fourth Avenue tunnel collision, Feb. 20, is reviewed. "The Board has secured the adoption of much better signal lamps, . . . and the new (additional) lamps, placed close to the ground, it is hoped, will not be obscured by steam or smoke." The false roof and other apparatus for removing smoke from the side tunnels, which the Board "hit upon" and recommended, is soon to be tried in a short section of the tunnel. There has been unexpected delay in the construction of the apparatus. The Board has investigated car lighting and has received favorable reports of the Pintsch gas system from the principal roads of the state. Reference is made to the approval of this system by the Commissioners of Ohio and Illinois. The Frost dry carbureter system is reported to the Board as giving entire satisfaction, but no mention is made of a New York road using it. The use of oil of 300° fire test is attended with very little danger and the Board has no record of any accident resulting from its use. The paragraph on the physical condition of the roads is taken up chiefly with an account of the work done by the Board in getting up a record of the railroad bridges in the state. The Commissioners criticised 630 bridges, all of which were repaired or rebuilt, and a number of others were repaired or rebuilt before the strain sheets were submitted.

This bridge report was noticed in the *Railroad Gazette* of July 24 last.

Chapters 563, 564 and 565 of the Laws of 1890, which were intended to codify previously existing laws touching corporations and railroads, went into effect May 1, 1891, and the Commissioners have revised the reprint of these laws which always appears in their annual reports. The matter seems to have been wholly reprinted. It ap-

pears, however, that the work of the Revision Commission is still in an unfinished state, and some of its incomplete work remains to be amended or completed by the legislature now sitting. The value of the work of this Revision Committee would seem to be much impaired by the narrow scope of the plan, numerous errors of a clerical nature in previously existing laws being reproduced in the new draft, evidently because the Commission had not the authority to make a change in such cases. The Commissioners last year refrained from proposing new laws, because they expected that the Revision Commission would be hampered thereby, but they propose this year to present drafts of bills as follows:

The operation of the valve is as follows: It is connected at A to the steam boiler and steam passes as shown by the arrowheads under the valve D, which is closed by the spring F and boiler pressure, and is opened automatically by a spring, L, bearing down on the diaphragm N. The steam passes out through the passage G to the train pipe, which is connected at B. When the pressure in the train pipe has reached the desired point the pressure on the lower side of the diaphragm N raises the diaphragm and permits the valve D to seat and close the train pipe from communication with the boiler.

In this valve the diaphragm is protected from injury by the upper case C, and, therefore, when the diaphragm becomes ruptured there is no danger of scalding the engineer and fireman. The valve D is prevented from chattering by the close fit which is made between the lower case G and the stem of the valve D. There is only space enough allowed at this point to enable the steam to percolate past the stem and reach the under side of the diaphragm M.



The next question which the learned counsel invoked in the equity side of the railroad litigation, was should not the plaintiff be compelled to elect as to whether he would sue for a trespass or a nuisance? If he elected to sue for a nuisance committed against him, then, by the Constitution of the State, defendants were to be entitled to a jury trial, as to the question of damages. In the Libman case (50 Hun. 428, Judge Van Brunt held that in bringing his action in equity the plaintiff could not deprive the defendant of its right of trial of the question of nuisance by a jury, and that the plaintiff was obliged to elect between the theory of trespass and nuisance. The outcome of this decision is that in equity cases the plaintiff as a rule elects to stand on the theory of trespass in order to avoid the jury; an unprejudiced jury being apt to give less damages than the special term judge, and his choosing this form of action brings forward of number of intricate legal questions which have not as yet been finally decided in the Court of Appeals.

For instance, the old, well settled rule of law has been (*Wood v. Lafayette*, 41 N. Y., 385) that only one in possession could sue for a trespass to property, hence the landlord who has leased the abutting property for more than six years prior to the commencement of the action cannot recover for past or rental damages. Again, all evidence of pure nuisances committed by the railroad company should in consequence be stricken from the record, since damage resulting from such nuisances is for the jury to determine. The lower courts have determined these questions adversely to the defendant company, so far, the first point, on the ground that, though out of possession, the owner of the property suffers by reason of submitting to a less rent; and as to future damages, suffers by a lessening of the fee value of the property. As to the second point, the invasion of the structure upon the easements of the abutting owner being a continuous trespass, as well as an original trespass, every act of nuisance during that invasion or trespass becomes *instantly* an act of trespass as well as nuisance, and it is impossible to separate the nuisance from the trespass and this has been since sustained by the Court of Appeals.

On Sept. 1, 1891, Section 970 of the Code of Procedure was amended so as to enable parties to actions involving injuries to property to move to send the question of how much damage to the jury in equity cases. The provisions of this statute have been taken advantage of by the railroad company to escape from the enormous and excessive judgments awarded by judges in cases where it was evident the courts sought to punish the elevated system for alleged "contumacy" as well as the "wanton invasion" of owners' rights. Their "refusal to pay until compelled to do by the strong arm of the law," has resulted in many cases in mulcting the railroad company in almost punitive damages, and they have fallen back upon the "bulwark of liberties," as Blackstone called it, the jury, as a far safer guardian of their just dues to be paid than the courts. The effect of this change in the code (which should be considered a popular one as it looks toward the reference of the damage question to twelve carefully selected jurymen rather than to one judge) is to cause a surprising revolt on part of the "fair-minded" abutter, in fact, to induce the abutting owners to abandon their claim for past rental damages, and so waive the right to go to a jury, and depend upon the courts to give them by alternative relief a lump sum which will practically compensate them for waiving their past damages; the theory of this "alternative" sum or "permanent" damages, being that it is just compensation on the part of the railroad to the abutter, in return for which the latter will not insist on his injunction, and will deed to the company his easements.

Another plan pursued by abutters to avoid the fair system of the jury is to waive the right to an injunction if defendants will consent to a reference of the question of damages to one or more referees. This on the whole is a fair method to both parties, as it is an accordance of both judge and jury, and so far has worked in a fairly satisfactory manner to both sides.

The latest decisions in the Court of Appeals refer chiefly to questions arising on the conduct of the trial, and on questions of evidence. Nearly every important question has been decided so far against the railroads. The recent decisions refer many of them to the expert evidence used in estimating the amount of damage. The Newman case to which we have alluded allows defendant to offset benefits arising from the road to particular properties—but excludes the general benefit to the entire vicinity. But in a very recent case, that of *Sommers*, the Court of Appeals have allowed "general benefits" to be offset—evidently the proper theory of damage. The *Gray case*\* refuses an injunction where only nominal damages are shown, and the *Doyle*† case permits evidence of the improved business done in the avenue through which the elevated road passes. It is quite true that the elevated road has damaged certain streets, but has greatly benefited others, and as the effect of the transportation of so large a body of passengers is felt, and the people become more accustomed to the railroad, the damages, as shown by rents and prices sold, will undoubtedly grow less and less. This is the history of fee and rental values generally even in

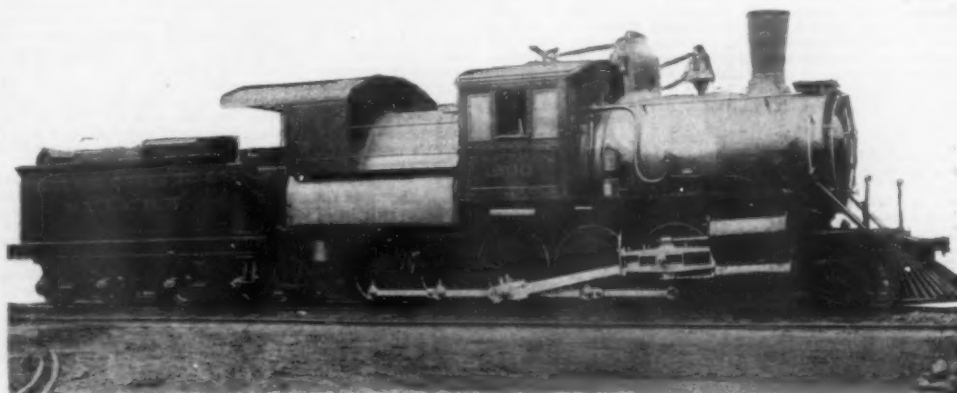
the most damaged streets. The high prices of real estate in 1872, which fell off 30, 40 and 50 per cent. up to 1878 from the panic, are coming slowly back to where they were at first, in streets off, as well as in streets on, the line of the railroad. People are getting used to the road. Third avenue is about where it was in 1873. Sixth avenue has been largely benefited. We predict that in another decade it will be difficult to show any damage whatever, due solely to the elevated railway.

Proving the values of property has developed a class of expert witnesses who make a business of testifying against the road. One of these has testified that he has made over \$30,000 in the last few years of litigation from this testimony alone. Courts and juries, however, are beginning to discredit this "hired" testimony, and show a commendable tendency toward narrowing its limits as far as possible. We may safely conclude that enormously severe damages will not mark the litigation of the future against the roads as it has done the past.

Future litigation will probably arise from the disposition on the part of the railroad company to increase its facilities for public benefit. The question of third tracks or sidings is not yet settled. The wording of the statute leaves the question of how many tracks indefinite, while granting the right to the Commissioners to lay out plans of "a railway or railways with the necessary supports, turnouts, switches, sidings, connections," etc. (L. 1875, c. 606). No third track was actually mentioned in the plans

enter. These injuries, such as smoke, gases, noise, cinders, etc., are proper elements only of "past" or rental damages. This is based on the authority of *Fobes vs. Rome, Watertown Railroad Co.*, 121 N. Y., 505, which holds, as we have said, that the injuries incidental to the operation of a surface steam railroad are not subject of damages to an abutter not owning the soil of the street. The theory followed by Daniels, J., in the *Sperb* opinion is that after the elevated railroad has once acquired the easements, or had paid the abutter for the right to have the structure in the street, then the court cannot give additional damages for the operation of the road or use of the structure. As Andrews, J., in the *Kane case* (supra) had said that "if defendant had the lawful right to operate its trains in the street, such inconvenience as might result to the plaintiff in the enjoyment of his property from the ordinary and usual operation of the defendants' road would not in the absence of negligence on its part furnish a ground of action."

The result of this decision, if affirmed by the Court of Appeals, will be to compel the court to separate out the elements of damages derived from the operation of the road, and leave in the elements of damage from the unlawful structure only, as applied to the future damages or the "lump sum" for obviating the injunction. The effect will be to lessen the award, but in certain cases it can make little difference, as the "lump sum" is practi-



A 12-Wheel Locomotive Compounded on the Vaucain System.

of the Railroad Commissioners, but the Commission is said not to be extinct but capable of being convened at any time, and so laying out a third or fourth track if deemed desirable. It would seem that this is in accordance with the meaning of the act and that the general public should not be deprived of suitable accommodations in case the present ones are found inadequate. A third track, certainly, would not greatly affect the abutting owner; the only person who is chiefly affected by the structure and who raises the cry against the railroad "grabbers," as they are called by the newspapers, and would afford a means of running through express trains from the Battery to the Harlem in a reasonably rapid manner.

Future litigation will therefore arise out of the third track, and also out of any new scheme, such as has been often suggested of late, of building a second story on the elevated structure. The railroads having "purchased" the easements of the abutter, the query arises, Has he any longer a cause of action if the railroads are thus made double decked? Undoubtedly the abutter is subjected to still increased annoyance; but has he not once and for all parted with his easements in the street, which, technically, are land presupposed to extend to "the sky and the centre of the earth," and can he still sue and recover? As the courts are now constituted it is safe to say that an ingenious legal reason will be found to force the roads into paying additional damages for any "increase in annoyance," whether by new tracks on the level with the present roadbed or placed above them, and in many, if not all, releases of easements the abutter has expressly reserved the right to all easements not taken by the railroad.

It is one of the grave questions which meet any new scheme of rapid transit at the outset, "How much damages will such a new company have to pay?" The answer will be "undoubtedly the full value of any easement or property taken." It must be remembered that the present railroad companies before 1882 regarded this question as answered in the negative. Able counsel, the best obtainable in the state, viewed the question originally, as did Judge Earle, and not Judge Tracey, in the *Storey case*, supra. The new rapid transit system will, perhaps, be able to calculate with considerable accuracy the amount of this damage to abutters.

The General Term of the Supreme Court in the case of *Sperb vs. Metropolitan* (see N. Y. L. J., Nov. 17, 1891), has recently decided that in the elements which make up the "future" or permanent fee damage, the injuries resulting from the use or operation of the road cannot

be legally within the discretion of the courts, and they can base their award upon the injuries from the structure. Legally speaking under the *Gray* and *Roberts* decisions (Court of Appeals, supra) the future damages must be based on the evidence, and the doctrine of the Superior Court that the award for obviating the injunction is a mere "favor" to defendant is exploded. The *Sperb* case is within the line of decisions, but it is not a foregone conclusion that it will be upheld by the Court of Appeals.

Although the court in the recent *American Bank Note case* (not reported) has decided that under the *Fobes case* (supra) the element of noise is not to be considered in estimating the damages from the operation of the road, it leaves still to be considered the dust, cinders, shadow, flickering light, etc., as element of damage.

(TO BE CONTINUED.)

#### Compound 12-Wheeled Freight Locomotive.

The accompanying illustration shows the largest locomotive yet compounded in this country. It is built on the four-cylinder Vaucain system by the Baldwin Locomotive Works for the Erie. The cut shows clearly the new design of crosshead. The following are the general dimensions:

Cylinders.....	16 and 27 x 28 in.
Drivers.....	59 in.
Total wheel base.....	27 ft. 3 in.
Driving wheel base.....	18 ft. 10 in.
Total weight.....	96½ tons.
Weight on drivers.....	85 tons.
Weight of tender.....	45 tons.
Diameter of boiler.....	76 in.
Number of tubes.....	354
Diameter of tubes.....	2 in.
Length of tubes.....	12 ft.
Length of Wooten firebox.....	10 ft. 11¼ in.
Width of Wooten firebox.....	96¼ in.
Heating surface firebox.....	182½ sq. ft.
Heating surface combustion chamber.....	31.8 sq. ft.
Heating surface tubes.....	2,308 sq. ft.
Total heating surface.....	2,443 sq. ft.
Tank capacity.....	4,500 gallons.

#### Locomotive Boilers.

Two papers on this subject were read at the meeting of the New England Railroad Club Jan. 13. They were by Mr. J. S. Speirs, of the Rhode Island Locomotive Works, and Mr. F. W. Dean. These papers follow pretty nearly in full, as they are the sort of papers that do not bear cutting down very well.

#### MR. SPEIRS' PAPER.

I will try to present some of the results of looking for several years at locomotive boilers, from a constructive point of view.

First, what the principal features of a good boiler for general use should be.

A. The heating and grate surfaces should be of such

\* See *Kenkelle case*, supra.

† During 1890-91 as many as twelve juries brought in verdicts of merely nominal damages to abutting owners.

‡ Since affirmed by Court of Appeals.



an area and character that with ordinary coal and attendance, more steam may be supplied than can be used when the engine is doing its heaviest work.

B. The greatest simplicity should be aimed at in construction, consistent with maintaining proper strength, confining the boiler within the usually allotted space.

C. The predominating idea in its designing should be to have the fewest pieces and parts possible. With this idea steadily in view the cost of maintenance as well as the first cost will be materially lessened.

D. The material should be of the best obtainable; the thickness so proportioned that all parts will have as nearly as possible the same factor of safety.

E. The grate area, where the firebox is between the frames, cannot be made too large, nor the grates with too much air space.

F. To help combustion the firebox should be of the greatest volume permissible, without interfering with the spaces for circulation.

G. Parts subject to change of form should be rigidly braced, but not a brace used where its presence is but an encumbrance. Retaining the shape of the boiler now in general use, perhaps the most perfect form of construction would be to make it without joint of any kind, as with cast steel.

No manufacturer has yet produced a steel too good for a locomotive boiler. The tendency of late has been to specify a steel much lower in carbon and of a lower tensile strength than the steel used a few years ago. This change is in the right direction; I would even go farther and advocate the employment of a steel of from 50,000 to 55,000 lbs. tensile strength, instead of from 55,000 to 60,000 lbs., as is now commonly used. Such a steel will stand the strains of flanging, punching and bending, and will, I might say, rest easier in place in the completed structure, than will a steel of a harder and less elastic nature. If the use of a steel as low in strength, as advocated, will, with the same thickness before used, lower too much the factor of safety, it would be far better, and I think in the end cheaper to add  $\frac{1}{8}$  inch to the thickness, draw our stays a trifle closer together and use the more ductile metal. Where existing conditions make it impossible to specify or obtain the best of steel for the whole boiler, it should be insisted on that at least the material for the firebox be of the very best.

**Firebox and Tubes.**—The firebox should be roomy, by this I mean it should be made as large as its outside casing or jacket will admit of; having at the bottom a space of 3 or  $3\frac{1}{2}$  in., gradually increasing this space to 4 $\frac{1}{2}$  or 5 in. at the top of the box, keeping the barrel of boiler high above rails, and so getting a good length of leg. There is no good reason that I know of why the crown should not be carried well up, leaving only sufficient space, where crown bars are used, to get in dry pipe and rigging, and space between bars and roof to admit of a good job on sling and back head stays. The idea often spoken of, and seldom put in practice, of making the flat sides of legs overhang the fire, should be carried out on every boiler made, say to the extent of  $\frac{1}{2}$  in. to 1 ft. The effect would be that this part of the heating surface would be of increased value and the plate less liable to overheating. Many will object to the width of the water space I have named. I think an increased space would give greater economy; but believe also that we would get less duty from the given space. The general feeling is, that more water space is needed, but we do not feel that it can be spared from the inside of box, and as there is not much chance of stealing from the outside, there the matter rests.

The making of large water space means the curtailing of grate area, firebox and tube heating surfaces; that lost from the firebox comes mainly from the crown sheet, where it can ill be spared.

I consider it advisable to secure every square foot of firebox surface possible. The various authorities give the ratio of tube to firebox heating surface as from 5 to 1, to 10 to 1. The least is probably the nearest correct in ordinary practice, where part of the flues are stopped up altogether and many of those remaining are choked with partly coked coal.

I am a believer in good circulation for promoting the economy of the whole boiler and making it a free steamer. To accomplish this end though, I think we should resort to some mechanical means or device, whereby we will know we are accomplishing what is proposed. Why not by some device, take the water from the colder parts and actually force it into the legs, in such a manner that there will be no doubt that you are getting a circulation, and that too in the right direction, upward, with no counter-current downward to impede the passage of steam to the surface? Another advantage of such a mode of water distribution would be that all parts of the boiler would be nearer an even temperature, thus getting rid of severe strains and promoting the life of the whole.

Water tables and kindred devices have been so far failures, for while they materially increase the heating surface, the evaporative performance does not show a like increase, though the bill for repairs generally does. The source of their supply for circulation is so inadequate that the intense heat drives the water out to such an extent that the trouble from leaky bolts and joints is endless. So far nothing has surpassed the watertube as a means of increasing the heating surface in the firebox, as well as for supporting that most admirable contrivance for helping combustion, the brick arch.

It is generally accepted as an established fact that tubes should be placed so that there will be a space, however slight, in the clear between the vertical rows; but within a short time I have seen the drawings from a large New England road, showing the tubes spaced horizontally so as to leave a  $\frac{1}{2}$ -in. bridge; the tubes on the next lower row being placed directly underneath these spaces.

**Shell.**—It is strange in making the shell so few avail themselves of a benefit which the steel manufacturers have been to great expense to bring about, using but one large plate. This would not only be in the line of greater simplicity, but it would also be less expensive to handle one plate. To see a section of boiler for use on a Mogul or eight-wheeler, as I have often noted, from 75 in. to 100 in. long, made in two telescopic rings, savors too much of the dark ages in the art of boiler work. With the improved tools of to-day there should be no trouble in handling plates up to 110 in. wide, or even wider. Plates may now be procured from the principal makers up to 110 in. wide, with a length of 230 in., and up to 120 in. wide, for one 200 in. long. The outside casing or jacket of firebox should always be made with one plate where possible. By making shell in one piece we eliminate a source of trouble and expense, a girth seam; it is easier to apply lagging and top work, and unnecessary to consult about placing of seam in regard to position and fastening of waist and guide yoke-plates. Besides, one is better able to set a proper pitch for the rivets in the longitudinal seam; a point with a certain sized rivet and thickness of plate it is sometimes impossible to attain with a very short seam.

It is a very common practice to make the shell and wagon top, when even the shell and back end vary in diameter from 10 in. to 12 in., all of one thickness. This practice is wasteful, for if the plate be of such a thickness that we get a proper proportion of strength for the wagon top, and connection with, say,  $\frac{1}{2}$ -in. plate, then the shell would be equally strong, or a trifle stronger with  $\frac{3}{8}$ -in. plate.

**Style of Boilers; Radial Stayed.**—The tendency of the day is to discontinue the use of the old crown bar style of boiler. Anyone who has looked into the merits of the radial stayed type of boiler, more especially the latest style with extended wagon top, cannot fail to be convinced that its more extended use is in the line of progress. Here we are more nearly approaching the ideal of simplicity. In actual numbers the use of radial stays on, say a boiler designed for an 18 x 24 in. engine, does away with 900 pieces. These include crown bars, washers, bolts, nuts, links, braces, crowfeet, lugs, pins, rivets, etc. One will scarcely credit that there is a total of 1,198 pieces and parts due to the bars and braces for same. The weight of this mass is 3,585 lbs., against 1,004 lbs. in radial stayed type. Perhaps the very worst feature of the boiler under discussion is that the angle at which three or four of the rows of bolts enter the outside sheet makes the operation of heading or riveting over the end a difficult matter, as the blow from the hammer does not fall in a line parallel to the axis of the bolt, neither is the holding on of the other end during the operation entirely satisfactory. By using care in fitting the bolts to the holes and skill in the heading over, however, a job that is entirely satisfactory may be obtained. I think it an object of importance to have two rows of stays each side of the centre on top, made with a head and screwed in from inside the box. These are mainly put in as a measure of safety in case of low water. The solid heads are preferable to nuts for two reasons. First, their greater holding power; second, it is possible by their use to secure a good fit of bolt in the crown sheet, a thing you are not sure of when a long bolt has to be screwed through from the outer sheet, as often the threads do not match and are injured in passing through the hole in crown. With the long straight bolts the dependence for tight joint is all on the contact of the copper washer against the under side of crown. The thread on the headed bolt is cut close under head in a lathe, and then sized with a sizer slightly tapered, so that a steam tight fit is secured in the holes.

The lack of tools adapted to such work has been the one thing more than any other that has kept the screw stayed boiler in the background, for any little trouble experienced in its manufacture is more than compensated for in its use by the complete accessibility of all parts for cleaning and inspection; a free steam space, with the dome well forward of the point of the greatest agitation on the water surface, insuring the supply of dry steam.

Another point of excellence is in the increased water holding capacity, a large part of which is in the solid body over the crown. In actual figures, taking as before a boiler designed for an 18 x 24-in. engine, in a space of 7 in. above and immediately over the crown, the boiler with crown bars will have 83 galls. of water; without crown bars or other incumbrance the amount in the same space would be 130 galls.—30 per cent. of the water holding space lost, and what remains is so cut up that with a hot fire the water must be tortured to a froth in its effort to send steam to the space above. The radial stays for an equal distance above the crown displace but four galls. of water; this leaves a difference of 49 galls. in its favor. Nor is this the total gain in water around the top, the crown curves downward to such an extent that here a gain is made of 41 galls., or 91 galls. in all around the box. The crown of the radial stayed boiler we are comparing has its crown raised 3 in. higher than the other, and has an extended wagon top, and contains when filled to second gauge 1,427 galls. The boiler with bars contains 1,048, or 373 less. Too much importance cannot be attached to this feature, as this extra amount of highly heated water, ready to flash into steam, will, when increased power is required, act as a reserve force. Suddenly starting the injector full force will not alter the temperature of the water to the same degree; neither will the water level fluctuate so rapidly, as the whole body of water above the crown is practically solid. It is evident, from the shape, that the volume and surface of the firebox have been reduced; the first,  $5\frac{1}{2}$  cu. ft.; the other, 11 sq. ft., out of a total of 141. This is an apparent loss. A large part of it must be made up in the greater efficiency of the surface remaining, as a curved surface or crown is presented to the fire, of 68 in. in breadth against 56 in. in the other type.

**Belpaire Boilers.**—Unquestionably the Belpaire boiler has merit. It is a favorite with many master mechanics as being a rapid and free steamer. I have noticed several times in reports of conventions and in the discussions of railroad clubs that it was favorably mentioned on account of its free crown surface and accessibility for cleaning. Those who talk in that manner surely never made an inspection of a Belpaire box from inside the shell. The number of vertical and horizontal stays mingled with those from the back head, present an almost solid look; to use a scraper would be an impossibility, and even a stream of water would lose all force as it was divided and subdivided. The same argument that applies to the four centre rows of radial stays applies also to the crown of the Belpaire box. It will pay to make them with heads and screw in from inside the box.

**Flanging.**—The flanging of a locomotive boiler is the hardest and most difficult operation in its construction. Much in its utility and life depends on the manner in which this work is done. The material has gone on year by year increasing in thickness, making the labor of shaping it more arduous, the strength of the men all the while remaining the same. The limit is near; with  $\frac{1}{2}$ -in. plates on the average and  $\frac{3}{8}$ -in. not uncommon, soon, I feel confident, we shall be making boilers for compounds to carry a pressure of 250 lbs. and made of  $\frac{1}{2}$ -in. plate. Even with such work as is done now, it is almost imperative with builders to provide themselves with a flanging press. Its general use will mark a new era in the locomotive boiler construction; difficult but perhaps very desirable shapes will then be attempted. Such flanges as the back head and connection between shell and firebox of the Belpaire boiler will then have no terrors. You are all familiar with the boiler designed and built by Mr. Strong. The one reason, more than any other, which has operated to prevent his design from coming into more extended use is the difficulty of properly shaping and flanging the plates connecting the shell and twin fireboxes. I think I am justified in saying that there is so much to be commended in Mr. Strong's boiler that many would have given it a trial but for the increased cost due to lack of facilities for doing the work. From a press the work would

come to the layer-out and fitter-up of a uniform size and shape, very much simplifying the work of both. The plates would be of an even quality with no local strains set up by local heating and working.

There is no reason why all straight boilers of a certain diameter should not have height of crown above boiler centre and shape of box fixed. The same applies to wagon top or Belpaire boilers; making the wagon tops in two classes 6 in. and 10 in. rise—I am presuming that all are now converted to round backheads—the length of the leg would make no material difference. The subject is one worthy the attention of the National Convention.

**Laying Out.**—Almost all the holes and all the shapes of plates can be laid out by a competent man while the plates are still flat. If only part of this work is done and the remainder left to be marked from other parts and holes placed by the various fitters as the work progresses the result is chaos—no two boilers alike and the expense of construction increased.

**Riveting.**—With the thickness of plate now in common use, all boilers should be built with butt jointed longitudinal seams. With a lap joint, the thicker the plate the greater the departure from a true circle. This distortion of form the heavy pressure now carried tries to correct. This tendency to buckle the plate in such a manner as will approach nearer what should be its proper shape is a source of weakness and is the cause of many leaky joints and rivets. The welt, where used, has been a more or less efficient safeguard against grooving; still it is not the correct thing, and with  $\frac{1}{2}$ -in. plate or over, nothing but a butt joint seam, with inside and outside covering strips, should be used. By using a wider covering strip inside than out, placing six rows of rivets in the inner one and four in the outer, we can get nearer the full strength of the plate than by any method save welding—a practice as yet not common in this country. By properly proportioning rivet and plate area a joint may be made to 85 per cent. of the solid plate. Circumferential seams should be double riveted, not so much as a measure of strength to resist pressure, but to better resist the strains and shocks received by engines in service and the tendency to grooving along bottom, due to differences in temperature between top and bottom of shell. Every rivet possible should be driven with machine. There are several of the smaller portable machines for special parts. I would specially recommend the use of one of these in the closing of the rivets in the firebox ring. By using such an appliance, a rivet  $\frac{1}{2}$  in. longer may be driven than could be closed by hand and after the operation leave no larger head, the extra length having been forced into the long hole, completely filling it. The head is also changed in shape by the holding on die which forces part of the metal from the head into the hole, making both ends equally to be relied on for tightness. Were such a machine in general use, leaky mud rings would be a thing of the past, except, perhaps, in the inside corners. The remedy for the gradual wasting away of these is not to be sought in riveting but rather in the increased flexibility of parts at the bottom—a remedy difficult of application, for we cannot work outward. By raising the grate a few inches and curving the bottoms of the four plates forming the box inward until a 6-in. water space was obtained we could insert a ring of pressed boiler steel, with flanges looking downward. Whether this construction and width of ring would give flexibility sufficiently to allow the firebox to move downward and horizontally enough to greatly help staybolts, rivets and corners, I am not prepared to say, nor do I know that it would in the end pay for the extra expense and trouble; it only occurred to me as a probable remedy.

**Staybolts.**—I am convinced if our fireboxes were free to expand from the centre of side sheet in all directions we would have little trouble from broken staybolts. Higher pressures may be responsible for part of the trouble lately experienced, but if investigated thoroughly I think thicker plates, higher and longer boxes will be found to be the chief causes. With the thicker plate now in use for the outside covering the staybolt is held so firmly and the plate is so stiff that there can be little or no movement; consequently, as the box expands upward and lengthways under the intense heat to which it is subjected the whole bending stress comes on a point just inside the outer sheet in which they are so rigidly held. Most of you will remember that when  $\frac{1}{2}$ -in. and  $\frac{3}{8}$ -in. plates were used it was a very common thing to see the casing of a box flake away inside around the staybolt holes at just the same locations as are now giving the most trouble, top rows and end vertical rows. Sometimes while the sheet would be flaked away the bolt would be perfect. At other times it also would be reduced in size at the point of contact and part way into the plate. I have seen sheets countersunk in this manner nearly through. This occurred because the sheet compared with the bolt and strain was comparatively thin and flexible; the bolt sprung the plate and also worked in the hole.

I would like to bring up the question of how a radial stayed boiler acts in regard to breaking stays. It looks as if there should be less trouble, as the height in a boiler of the same size to the last short bolt is some 10 in. less. While drilling bolts will indicate when a bolt has broken, it in no way acts as a preventive. Some remedy or escape there must be and it should be sought. A larger bolt, of say  $1\frac{1}{2}$  in. or  $1\frac{3}{4}$  in., would make the ratio between plate and bolt somewhat the same as when the bolts were  $\frac{1}{2}$  in. and plate  $\frac{3}{8}$  in. or  $\frac{1}{2}$  in. Even if this worked in the same manner I do not think it right to cure one evil and cause as great a one. I would not sacrifice the plate to save the bolt.

Turning bolts down to the bottom of the thread, leaving but 2 in. or so of thread at each end, is by no means a new thing in boiler work, but has been generally used only on long stays to save time in cutting and running them in. I would like to see the experiment tried of using 1-in. bolts turned down  $\frac{1}{4}$  at a point which, when in place would be one-third of the width of the water space from the inside sheet, then taper out each way to full size at a point  $\frac{1}{2}$  in. or  $\frac{3}{4}$  in. from the inner face of both sheets. Perhaps to make such a test of value, it would be well to put in every other bolt made in this manner, and the others of full section. The length of life and usefulness of each could then be tested under the same conditions.

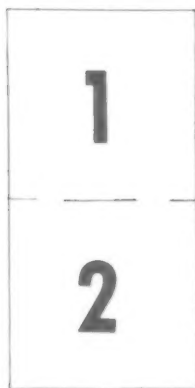
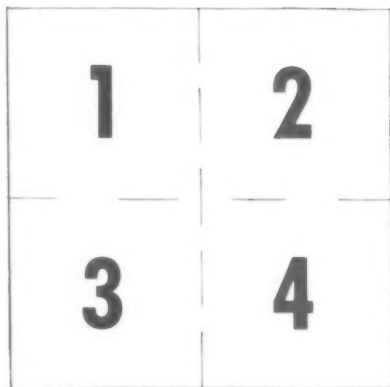
**Bracing.**—For the support of the back head above crown, and front head above tubes, the simplest brace is the long rod from end to end. Where such a brace is well supported at about the middle it is an efficient stay. Where not so supported, it will give trouble by leaking or breaking at the ends. A 17 ft. or 18-ft. rod will vibrate badly when the engine is in motion.

A liner  $\frac{1}{2}$  in. or  $\frac{3}{4}$  in. thick on the inner side of back head, extending down to take the top row of staybolts, stiffens that part and better distributes the strain on the staying. Some oppose the staying of back head to shell or connection, on the ground that by so doing these parts are subjected to great strain, the angle of the stays caus-





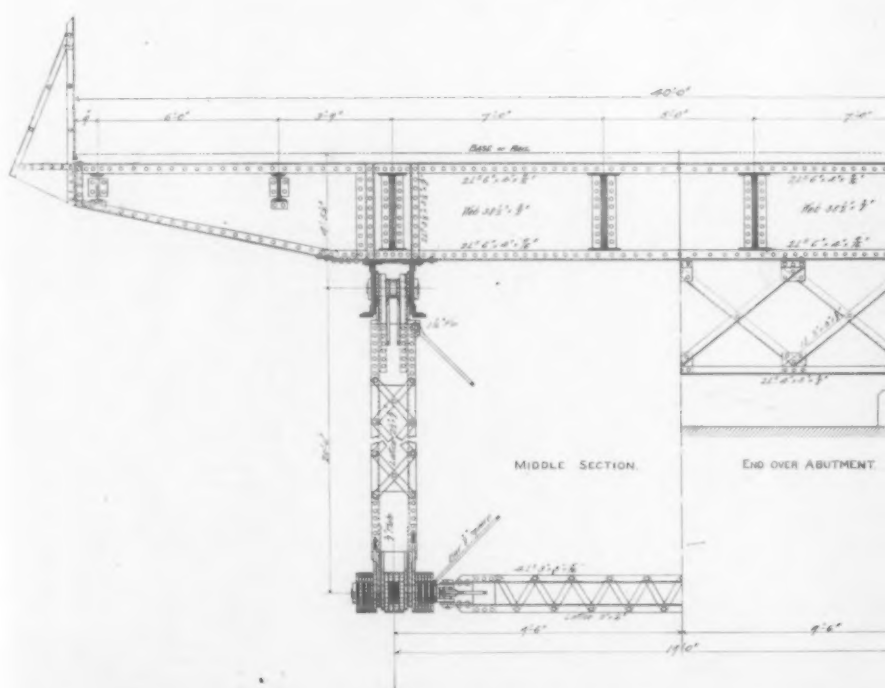
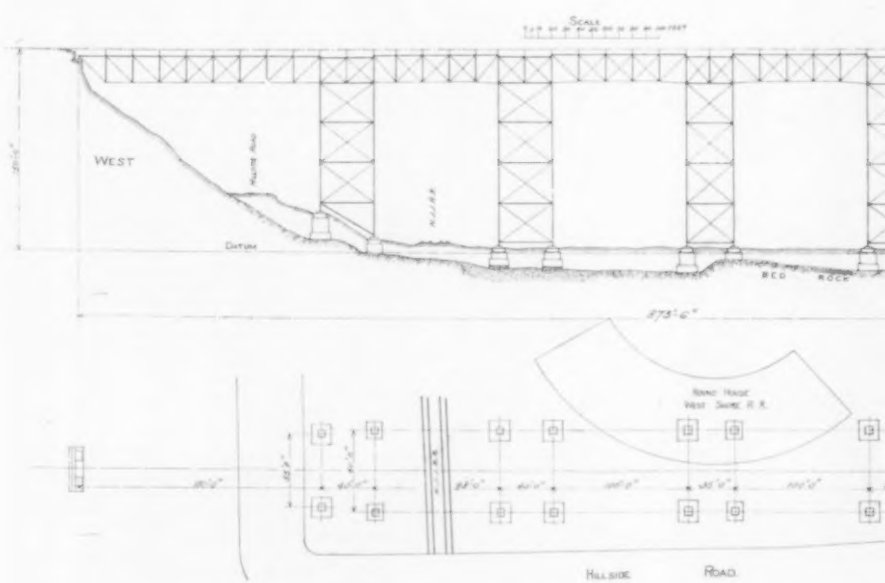
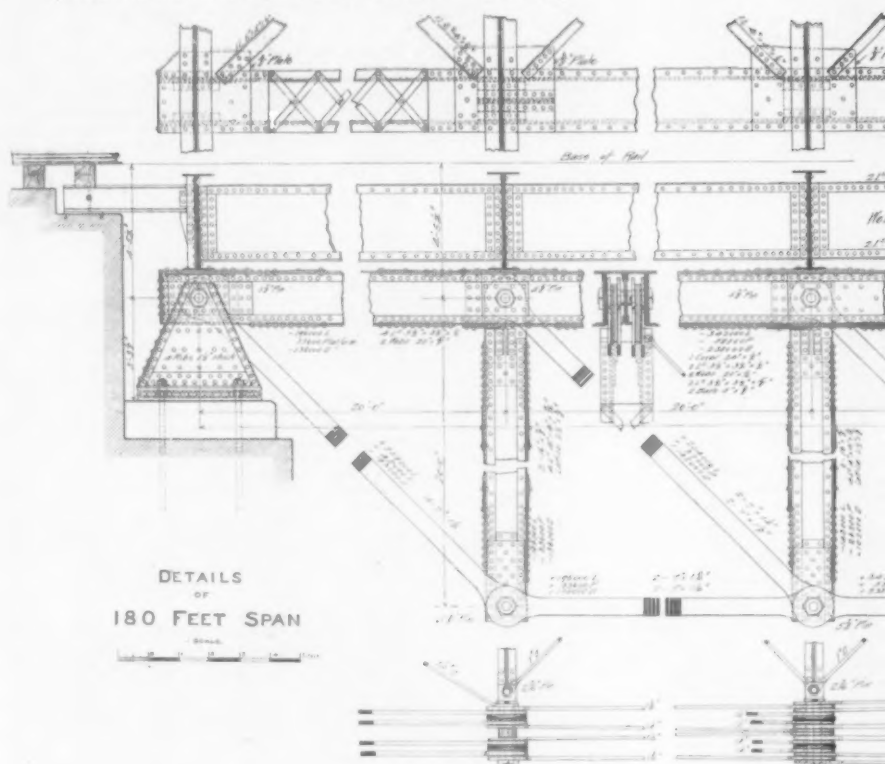
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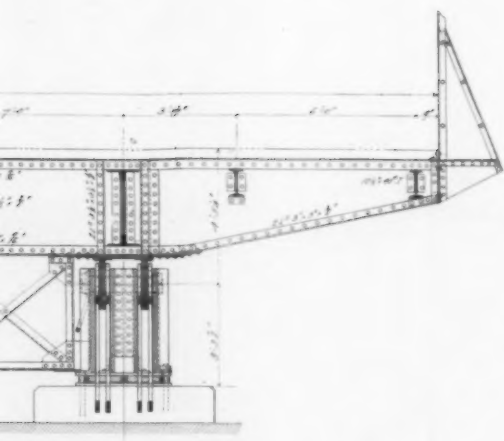
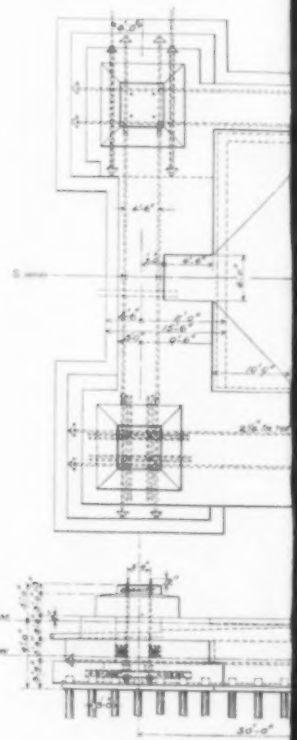
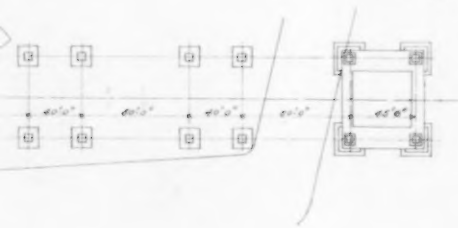
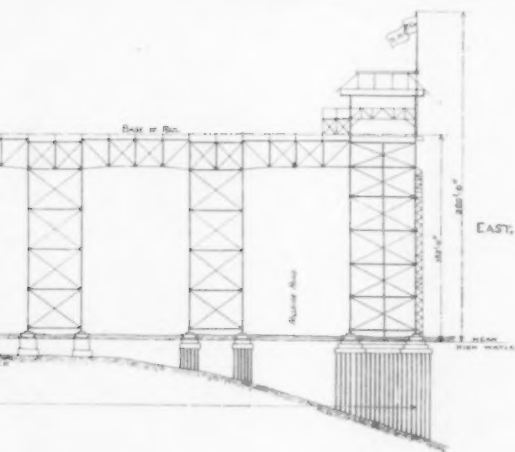
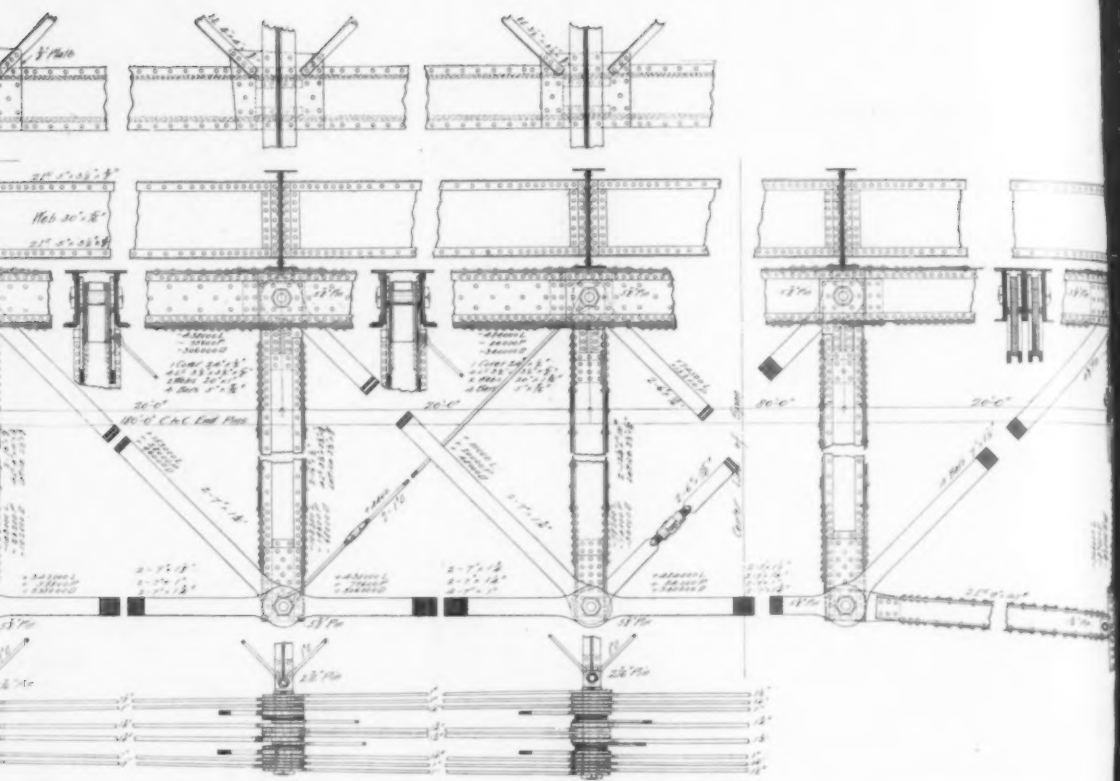


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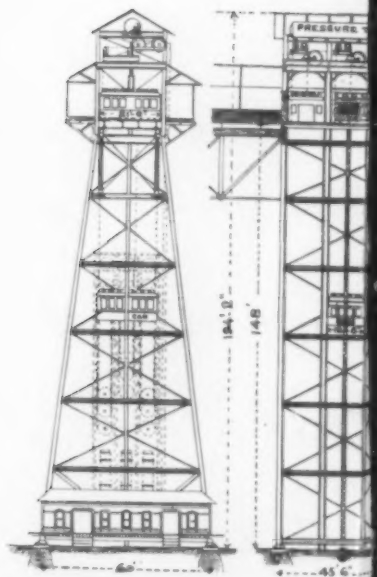






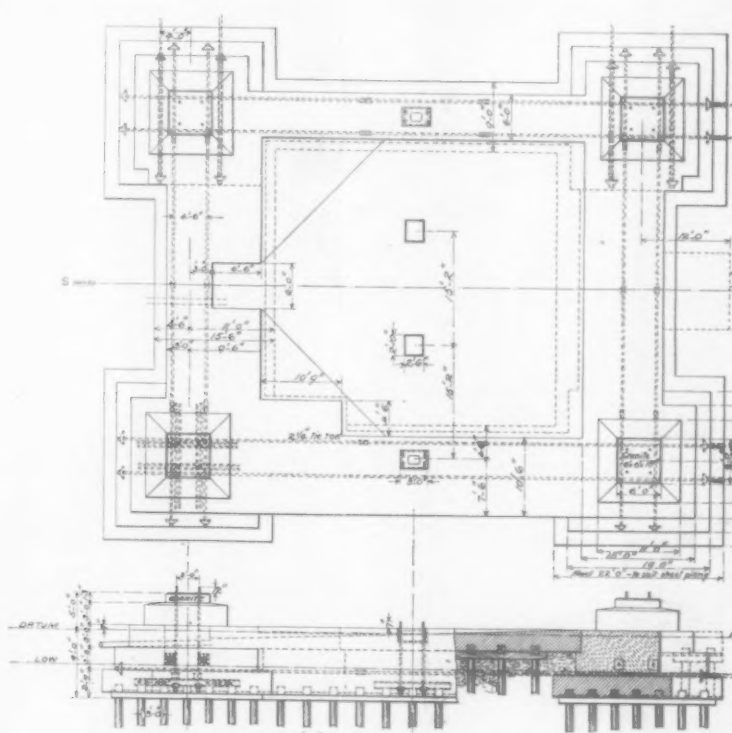
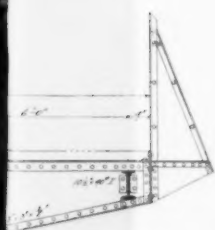
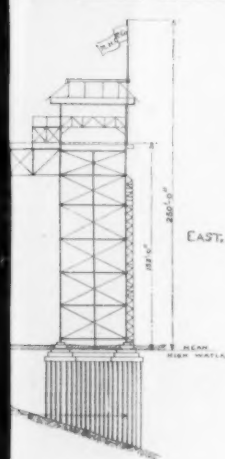
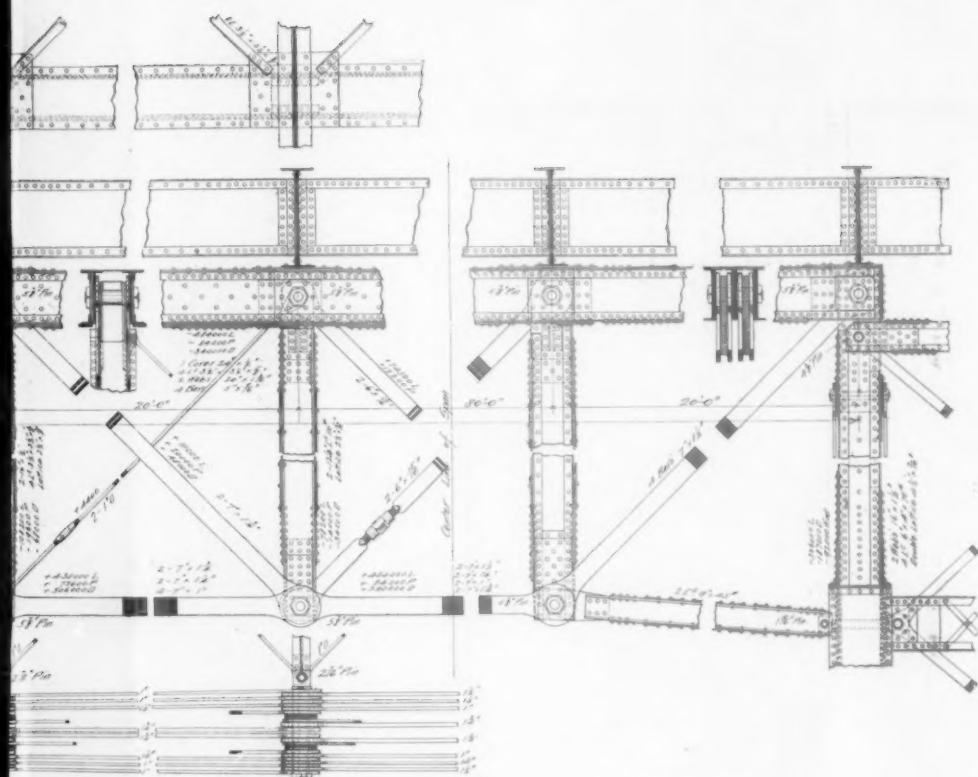
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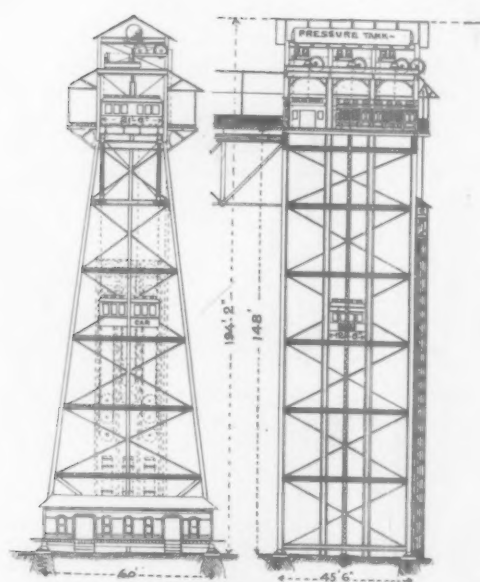


Front and Side Elevation of Elevators

THE WEEHAWKEN VIADUCT AND PASSENGER ELEVATORS OF THE NORTH HAVEN  
Built by the PASSAIC ROLLING MILL CO., G. H. BLAKELY, CHIEF ENGINEER



Foundation Plan of Elevator Tower.



Front and Side Elevation of Elevator.

THE WEEHAWKEN VIADUCT AND PASSENGER ELEVATORS OF THE NORTH HUDSON COUNTY RAILWAY.  
*Built by the PASSAIC ROLLING MILL CO., G. H. BLAKELY, CHIEF ENGINEER, Paterson, N. J.*





DETAIL  
SIDE ELEVATION OF REGULAR TOWER

SCALE  
0 10 20 30 40 50 60 70 80 90 100 FEET





ing a tendency to flatten, the direct pull to tear the shell asunder, and again, that the extra holes for attachment will unduly weaken the plate. As a matter of fact, the braces from back head, when carried to shell, have a very slight inclination; most of them being in a direct line, any little strain set up the plate is amply able to resist, aided as it is by the pressure within. In regard to the holes for the attachment of braces, as the measure of the strength of the shell is the resistance of the longitudinal lap to tearing apart under pressure, the holes for two, or even three, braces in a line across an ordinary shell plate are not going to leave the plate as weak as at the joint.

If in putting stays from crownbars to roof, two to each bar, placed from 6 in. to 8 in. each side of centre, are not thought sufficient, rather than put on four, as is often done, it is better to increase the size of both stays and crownbar. Where crownbars are used they should be of ample strength to sustain their load without aid, the sling stays being applied as a measure of safety in case of overheating.

**Testing.**—Locomotive boilers are not usually tested high enough to warrant carrying of such pressures as 100 lbs. About all insurance companies make it a rule to add 50 per cent. to the pressure allowed for the test pressure. The practice, I think, is a good one. It is better to make this test for safety with warm water. The test for tightness should be made later with a steam pressure of about  $1\frac{1}{2}$  times the working pressure. A boiler made tight under a water pressure is seldom perfectly tight under even a less pressure of steam, and the same would be true of steam first and water afterward. It is better to make the final test under as nearly as possible the working conditions.

#### MR. DEAN'S PAPER.

I believe it is estimated that there are about 150,000 locomotives in existence, and with few exceptions they have the usual form of staybolt boiler. The inference might therefore be drawn that this is the safest type of boiler in existence, as an explosion is comparatively unknown. There is, of course, an occasional explosion, but this should not be placed to the discredit of the boiler.

**Work Done.**—Let us glance at the service which the boiler performs, and in order to appreciate it a comparison of its duty with that of stationary boilers is interesting. A stationary boiler when working at an economical rate evaporates some two or three pounds of water per square foot of heating surface per hour, but the locomotive evaporates seven to fifteen, more commonly ten to twelve. The stationary boiler is allowed eight to fifteen feet of heating surface per horse power, but the locomotive boiler has but one to four. The temperature of the escaping gases of stationary boilers is not much over 400 degrees, while those of locomotives have ranged from 600 to 1,200, very commonly 800. If the pressure is 150 lbs. per square inch, a pound of steam occupies a volume of 2.75 cu. ft., and 15 lbs. occupies 43.25 cu. ft. Such a rapid formation of steam calls for a full opportunity to escape and points to the undesirability of overhanging furnace sidesheets. The heat from the fire is transmitted into the water by the staybolts, and the larger the heads the more efficiently this is done.

The severe service to which the locomotive boiler is subjected is more apparent when we consider the amount of coal burnt per square foot of grate per hour. In stationary boilers it is from 5 to 20 lbs., in locomotive boilers from 60 to over 200. With these consumptions the evaporation per pound of coal is low, with good coal 3 to 7 lbs. of water. The boiler is subjected to great and sudden extremes of temperature, for if it steams too freely the door is opened wide. Recent tests of the quality of steam show that even when working hard the boilers of locomotives send over less than one-half of one per cent. of moisture, less than is found in many stationary boilers. This is due to large water surface and steam space. No locomotive boiler was ever too large or is likely to be, for the reason that from the point of view of economical use of fuel the boiler is always overworked.

**Material.**—The first matter to decide upon with reference to a boiler is the quality of the material. It is easy to obtain good steel from the various makers throughout the country, and it is probable that any maker can deliver good firebox steel if required.

The most valuable quality which boiler plate can possess, provided it is not at the sacrifice of any other, is a high elastic limit. If the steel is strained within this limit it returns to its original length after the load is removed. If the stress goes beyond this limit, the steel breaks down, so to speak, is out of shape, and the boiler becomes leaky. A boiler should have its factor of safety determined with reference to the elastic limit and not with reference to the ultimate strength of the plate. This shows how unnecessary and unwise it is to specify the ultimate strength, except the upper limit in order to prevent an excess of carbon. In other words, if the elastic limit is brought about by working a low carbon ingot and is accompanied by great elongation and contraction of area upon being tested, it should be the most important quality of steel. It is well known that it is easy to secure a high elastic limit in thin plates on account of the amount of work which is put upon the ingot by the rolls. This points to the importance of having thick ingots for thick plates, and an ingot some 25 times as thick as the plate to be rolled gives good results.

Besides tests for elastic limit, elongation and contraction of area, it is well to have quenching and bending tests. This is done by heating a piece of plate to a cherry red, plunging it in water and then bending it over a cylinder whose diameter is twice the thickness of the plate. Most steel will, however, bend down flat under a hammer after quenching without fracture.

For fire plates it is best to be content with a low elastic limit, say 30,000 to 32,000 lbs. to the square inch, and to secure strength by thickness of plates and frequently of staybolts. Test pieces should be long enough to give the elongation in no less than 8 in. in order to enable us to judge better of the material, for if the length is restricted we compel the elongation to take place in too small an area to be representative. Every effort should be made to prevent any part of boiler plates being strained up to the elastic limit. Plates can be so strained by punching and flanging. If holes are punched  $\frac{1}{2}$  in. small and reamed to size, the injured material is mostly removed, but the proper way is to drill all holes in place. When a boiler shop is once fitted for this work the expense is but little greater than for punched work. If reaming is done it would be better to drill the holes of an inner plate with the outer punched hole as a guide. This assures fairness of holes and avoids eccentric reaming. If both holes are punched the reamer will become inclined, and cause eccentric reaming in both holes, and remove only a part of the injured material from each.

A plate closing ram of a riveting machine, unless used with care, overcomes the elastic limit by making a circular indentation around the rivet hole. Considering that

this is the weakest part of the boiler, viz., the joint, it should be particularly avoided. The elastic limit is often overcome by flanging, and this indicates the importance of annealing plates after flanging. This would probably delay the almost inevitable cracking that takes place in the throat sheets of boilers when they are spread out to join the circular part of the shell. The inner sheets without doubt become annealed in service, so that if they do not crack when new they are not likely to do so.

**Circulations.**—The general direction of the circulation in locomotive boilers is upward at the firebox and forward in the upper part of the boiler, downward at the forward end and backward at the bottom. It is obvious that the more freely this natural movement takes place the more freely the steam escapes. The escape is undoubtedly facilitated by the jar of the engine, and this is an advantage which the locomotive boiler possesses over stationary boilers of any kind. Now let us see what obstructs circulation. It would be obstructed by an insufficient feeding of the water spaces, and for this reason I advocate a very wide front water space in order to properly feed the side spaces. I advocate side sheets which do not follow the form of the outside sheet, but which are slightly inclined inward, provided no disadvantage follows. When the firebox is between the frames, as is generally the case in New England, this makes a narrow firebox at the top, but it can accommodate a wide tube sheet by being flanged out forward. This has been the practice on the London, Brighton & South Coast Railway for many years.

Circulation can be facilitated by abandoning transverse crown-bars, as they obviously interfere with the upper horizontal current of water. The general circulation in the barrel can be facilitated by using a large shell and placing the tubes far apart, and by placing the tubes farther apart horizontally at the front end than at the others. The inclination of the tubes to the tube sheets is so slight that the tubes are as tight as usual. The writer has practised this method for several years in stationary boilers. Inclining the side sheets of the firebox not only promotes better circulation, but gives greater elasticity to the upper staybolts by making them longer, and this prolongs their life. The usual method of accomplishing this desirable end is to use enough staybolts at the top to make the structure in that vicinity sufficiently strong and rigid to throw relative movement between the plates elsewhere. The long staybolts would render this unnecessary, or if more strength of stays is necessary at that point, a larger diameter of bolt can be used. Another advantage of the narrow crown-sheet is that fewer crown stays are needed, shorter bars can be used if they are transversely, and fewer if they are longitudinal. The longitudinal bars, besides interfering with the horizontal circulation less than the others, permit the longitudinal tie rods to be placed where they are needed for properly staying the backhead. I have seen some boilers that have these rods dangerously far apart. In order to properly support the longitudinal bars the outer crown-sheet should be stiffened with two heavy T irons, from which the bars can be supported at two points in each, as in English practice.

**Form and Staying.**—Next let us examine the form of the boiler about the firebox. The circular form of a flexible thin shell is the form which it takes when subjected to uniform internal radial pressure, and, therefore, if it is circular it is in equilibrium and will maintain its circular form when subjected to such pressure and not otherwise. Let us examine what occurs with a crown boiler under pressure. There are in many cases as much as 200 tons of pressure tending to force the inner firebox downward out of the boiler. How is this pressure resisted? It is resisted by the base or mud ring at the bottom, which tends to rotate (and this points to the advisability of double riveting this ring), by the stiffness of the staybolts and by connections from the crownbars to the shell above. The crown-sheet, of course, tends to go down, and actually does so, as I have found out by experiment. In doing this it bulges out the curved sides of the inner firebox. In depressing the crown-sheet seeks assistance from the outside crown, but this being in equilibrium from internal pressure, and thin, is as unable to resist distortion from this cause as a distended toy balloon is unable to resist the pressure of the finger. It therefore depresses and the sides bulge out. The inner crown-sheet surely goes down, the sling stays are in unequal and absolutely unknown stresses, the upper and other staybolts are bent and all conditions for overstraining and breakage are present.

Transverse tie rods just above the crown-sheet simply modify the unknown stresses, but do not simplify the chaotic condition of them. This is enough to cause staybolts to break, and in my opinion is the great cause rather than the expansion of the side sheets. The depression of the outer shell forcing out the sides assists in cracking the upper part of the throat sheet. Another common feature of construction assists in this last phenomenon. I refer to the common practice of not using a circular form to the outer crown-sheet, not that this would do any good to this sheet, but it would give circular cross-sections to the conical part of the shell immediately in front, thus avoiding a flat place on each side. This flat place tends to bulge out and assists in cracking the throat sheet.

The radial stay system has the same faults as far as stresses in the parts are concerned. When the boiler is under pressure the stays are in unequal and unknown stresses and many parts must be dangerously strained. The Wootton variety of this form is an extreme case and its weakness is more apparent. If we take a cross-section of this we shall see that the pressure acts upon the sides as it does upon a Bourdon tube in a steam gauge and it tends to straighten out as the tube does. It is easy to see that the tendency is to pull the staybolts out of the thinner sheet. This shows the necessity of tying the sides of the mud ring to each other at intervals. My own opinion of all the forms of boiler thus described is that they are unsafe. Any structure in which the stresses cannot be computed is likely to be unsafe.

Now let us see if there is not some form of boiler which is free from all of these defects; in fact a boiler which possesses nothing but virtues. If we had a boiler which tends to lift up the crown-sheet as much as that sheet tends to go down, it is evident that there would be no pressure tending to force out the firebox to rotate the base ring, to bend the staybolts, to render computations useless, and to distort the outer shell. The Belpaire firebox, named after its distinguished inventor, has these qualities, and the principle of its design is this, that any flat surface of the inner firebox has a companion equal flat surface upon the outer. This permits the corresponding surfaces to stay together by staybolts of various lengths, and all pressures are perfectly balanced. Moreover, as the stayed plates are flat, they are elastic and yield to movements produced by changes in temperature. Every part can be properly stayed, the stresses

properly computed, and the conditions of stress are not changed when the boiler is hot.

This boiler is safe with any pressure for which it is designed. As the crown-sheet does not go down staybolts will break less than in any other boiler. Circulation is free over the crown-sheet, water surface and steam space are great, and longitudinal tie rods can be placed where needed. The weight is a minimum because every part is proportioned for its stress. With this boiler carefully worked out I should not anticipate any cracking of the extremities of the throat sheet. Of course boilers of this kind can be imperfectly worked out and trouble will follow, but what I mean to say is that if this boiler is properly designed most boiler troubles will disappear. Flat places should be carefully sought out, and there should be no staying between the back head and this outer crown sheet.

**Joints.**—Of course there is no difference of opinion as to the superiority of the butt joint for boilers with inside and outside covering plates. The circular form is preserved best by it, and it gives the strongest joint. In case an extra strong joint is wanted—and who does not desire it!—the inside plate can be extended beyond the outside, and one or more rows of wide pitched rivets placed through it and the shell proper. In this case the inside plate should be as narrow as is consistent with the object in view, because any inside plate tends to straighten out between the rows of rivets, and thus be ineffective in a measure. This plate should be as thick as the shell, in order to minimize such a tendency, but it should be pointed out that this tendency would not exist if the inside plate could be calked, and thus the steam prevented from getting between it and the shell. The calking cannot be done, however, unless the covering plate is very thick and scalloped around the rivets. Whenever a joint is made in this way, and it is not uncommon in foreign marine works, the narrow plate is placed inside and the wide scalloped plate outside. This makes the strongest possible joint, and probably has an efficiency of nearly 95% in the boiler.

While upon this point I wish to point out the deceptive nature of a joint that is frequently seen on locomotive boilers. I refer to the lap joint with an inside bent covering plate. I have watched the behavior of large sections of this joint in the Watertown testing machine and can testify to the all but uselessness of the weld. Its action is to straighten out and allow the main part of the joint to be ruined before it is pulled taut, at which time, of course, its own elastic limit is passed at the bend. Such a weld should always be thick and the rivets nearest the bend should be as close as possible to it.

**Tubes.**—Concerning tubes, many people believe that long tubes are objectionable. It should only be remembered that the smokebox temperatures of our locomotives are between 600 degrees and 1,200 degrees, while the temperature of the steam is not usually much above 300 degrees. We either want longer tubes or more tubes of the present length. In other words, in the usual type of bituminous coal burning locomotives the heating surface should be more than 73 times the grate surface, which is the common ratio. In France this matter of tube lengths has received much attention, and tubes 16 ft. long have been used for years. In conclusion, I wish to call attention to the device of a Frenchman for increasing the heat absorbing surface of tubes—the Serve tube, which has longitudinal internal ribs, thus increasing the inside surface some 90 per cent. These ribs not only possess more surface, but the ribs slice up the gases and abstract the heat from the centre. It seems to me that this provides a most promising means of cooling down the gases in locomotive boilers. Tests have shown an increase of evaporation per pound of coal of some 10 per cent. to 15 per cent.

#### DISCUSSION.

MR. LAUDER: I have heard these matters discussed for the last 30 or 35 years, and have heard the poor old locomotive boiler sadly abused, yet for 60 years it has done its work and done it well. If a boiler is properly built and tested, properly inspected and taken care of, and the repairs looked after when weaknesses are discovered, there is little danger of explosion. I have never discovered any particular merit in the radial stay boiler. With the good water we have in New England, I see nothing wrong with the ordinary type of boiler, with the firebox stayed with crown bars; it has stood the test of service for a good many years. Where the water is bad, impregnated with alkalis, the crown sheets are soon used up, and the radial stay boiler is better for use; but under the circumstances I should prefer to use the Belpaire boiler. That boiler practically is right, but it has developed some weaknesses, possibly due to not being properly designed. Whether it can be designed to stand the rough usage which most locomotives get I think is an open question. It has the merit of having flat surfaces both of the inside box and the outside shell. The theory that when a boiler is under high pressure the outside circular crown is flattened by the pull-down of the sling stays I think is largely imaginary; if that occurred to the extent sometimes supposed the plates forming the outside crown would soon give way. It is true that that has sometimes happened. We have had longitudinal cracks develop in the outside crown of locomotive boilers, but it was always where that outside crown was made in three sheets, with a double riveted lap seam, which invites this trouble. With regard to the supposed want of circulation in the locomotive boiler, I think the circulation of water in a well designed modern locomotive boiler is almost perfect. Were it not so, with the intense heat that is generated in the furnace, the plates would soon show the effects of overheating.

MR. DEAN: Mr. Speirs has shown by direct experiment that the crown sheet does go down on the side; he found it went down over .08 of an inch, and it is not unreasonable to suppose that the middle went down farther. I remember a 60-in. boiler, with a  $\frac{1}{2}$ -in. plate, and the outer crown sheet was stiffened up very much by heavy bars rivetted to it. I put a template on that boiler, making it go over between two certain points, and found the middle of the outer crown sheet fell  $\frac{1}{2}$  of an inch.

MR. COLEMAN: I have had great sympathy with Mr. Wootton in his attempt to make a large firebox, to get the same results in economy of fuel and efficiency of boiler that we get in stationary boilers. There is no question that locomotives generally are very efficient instruments, but they are run at great cost, and when you see lumps of coal coming from the top, you get an idea of the waste of material, and it seems to me that Wootton made a great advance in the construction of his boiler. It is true that the boiler is in such shape that it must be weaker than others, but I have not heard of any of his boilers blowing up.

MR. LAUDER: I don't want it to go out that this club considers the Wootton engine superior to any other engine. It was tried on a great many roads in this country, and so far as I am informed it failed to do what other engines do every day. It has never made much headway except on the Reading road.





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#### EDITORIAL ANNOUNCEMENTS.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in his journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

In another column will be found an important diagram showing the variations in the air brake piston travel for four months on coach No. 688, Philadelphia & Reading Railroad. Probably no more conclusive evidence than this can be offered of the value of some form of brake adjuster. The slight difference in the travel from the time the new shoes were put on until they were worn out is surprising and decidedly satisfactory, and must result in a greater uniformity in brake service on the different cars in a train which are equipped with some form of brake adjuster than could possibly be had without it. It not infrequently happens that the shoes on one or more cars in a train do much less work than the others by reason of a long piston travel. Brakes when in this condition are liable to be dangerous, as the pistons not infrequently bottom in the cylinder and become ineffective. Therefore it may be well said that a brake adjuster is a safety device on a railroad train.

Incredible as it may seem, the practice of making cast iron knuckles for the M. C. B. coupler is still carried on regularly and to a considerable extent by at least one railroad in New England, or was up to two months ago. We will not swear that it has not been abandoned within that time. This company has patterns for knuckles for a variety of couplers of the M. C. B. type, and one founder has said "We make lots of them for that road on its orders." These knuckles are called malleable iron, but everybody knows that metal of the thickness of the M. C. B. knuckle cannot be malleable to such a depth as to increase its strength beyond that of cast iron, and it is a mere fiction to speak of these knuckles as malleable iron. Such a practice is not only disgraceful to the railroad company pursuing it, and a grave injustice to other railroad companies and to the manufacturers of couplers, but it would be excellent ammunition in suits against the company for indemnity for injuries to persons caused by couplers made of improper material. We suggest to lawyers having occasion to bring suits of this nature the propriety of investigating the material of which the broken coupler was made.

Either the whistle or the bell of the locomotive must be sounded on the approach of a train to a highway crossing in Connecticut, Massachusetts, New York, and some other states; and a statute thus worded would seem to excuse a road from giving both signals; but a decision of the Connecticut Supreme Court, as reported in the sixth case in our law column to-day makes a serious modification in the law as ordinarily understood. It is quite likely, however, that the case is too briefly reported, and that there are other considerations which enter into the question. The essence of a

road's duty is to give a sufficient and reasonable warning, and in case of a controversy where the custom of giving both signals is universally prevalent, the burden of proof is generally on the railroad company to show that the bell alone is sufficient. But if a road voluntarily undertakes to give both, it thereby confesses at least to a doubt as to the sufficiency of one alone, and is consequently bound to carry out its intention with care and precision; to sound the whistle at the right point. This is, doubtless, the ground of the Connecticut decision. The sounding of the whistle six or eight seconds too soon (that corresponds to 400 ft. at usual passenger train speeds) is, however, a pretty narrow margin on which to convict an engineman of law breaking in such a matter. In fact, it is splitting hairs in altogether too fine a fashion, for the practice of giving only one whistle signal for two crossings 400 ft. or more apart has been followed on some roads for years with no complaint. There are now hundreds of crossings which have been so well protected with gates that the whistle signal ought to be abolished, so far as they are concerned, for the benefit of the long suffering residents who are compelled to hear the noise scores or hundreds of times a day; and superintendents have a duty to see that the desired relief is granted. They should, of course, do this without waiting until citizens become exasperated and appeal to the newspapers or the courts, and we therefore caution them not to be unduly scared by this Connecticut decision.

On Jan. 2 *Engineering News* said that "so long ago as 1881 the Providence & Worcester road, 34 miles long, equipped its entire main line with automatic electric block signals," and further, that "in 1881 . . . it block signaled its entire line with the most approved plant." In our issue of the next week we said "the Providence & Worcester has no block system except on about six miles at the Providence end. Electric track circuit signals are in use at each station for local protection." Jan. 18 our contemporary returns to the matter in various articles and with a variety of statements. Boiled down, these statements are that the entire line of the Providence & Worcester Division of the New York, Providence & Boston is equipped with a block signal system which "is, so far as protection against trains is concerned, absolutely the most perfect of all." This is a fair summing up of the editorial expression in the several articles. These articles fill a number of columns and contain a variety of things more or less relevant and more or less discursive; but what concerns us now is justly and sufficiently condensed in the one sentence above. Nevertheless at the conclusion of one of those articles is the following from the Chief Engineer of the road:

I note your publication of my letter of Dec. 30, 1891, to which I had no objections, also a statement in the *Railroad Gazette* bearing on the matter of signals on the Providence & Worcester Railroad. It is true that the Worcester Division is not continuously blocked, as one might infer from my letter of Dec. 30 wherein it was only claimed, however, that about 42 per cent. of our main track mileage was protected by block signals; but in further explanation of the facts regarding Worcester Division between Valley Falls and Worcester I will say that that portion of the road has automatic block signals at all stations and in some places (considered more especially dangerous) between stations; furthermore in several instances the stations are so near together that these station signals become in effect continuous blocks.

We may safely leave our case in the hands of the Engineer, merely saying that we used and expect to use the expression "block system" in the sense usually accepted. That is, we mean that the line worked under the block system is divided into consecutive sections, with a signal at the end of each section, and that all of the line included between two consecutive signals is protected by them. If two station yards are protected by signals, and trains are allowed to run between those yards on time intervals, the road cannot properly be said to be worked on the block system. This is not a matter of hair-splitting definitions, but of principle and of operative practice; the distinction is fundamental. We recognize and appreciate the enterprise and intelligence with which the Providence & Worcester has been protected. Doubtless the track circuit signals have had a good deal to do with the safety with which that road has been operated. Other roads have also protected yards, tunnels and curves with automatic signals, but their officers do not claim that those roads are worked under the block system, nor do the officers of the Providence & Worcester make such a claim.

The innovation in the ticket department of the Chicago & Alton, briefly referred to heretofore, and more fully described in another column, is more immediately interesting by reason of the possible objections of passengers, who must be placated, however un-

reasonable they may be, if they take a notion that their rights are being infringed. We have not yet heard of any difficulty on the Alton, however. But the new tickets are also interesting from an operating standpoint, and we are somewhat surprised to learn that the agents prefer a ticket that has to be punched to one that is finished by the printing press. But the six new forms take the place of 100 or more old ones, so that the drawbacks incident to the change will be found in the accounting department, if anywhere, and the agents probably will have more definite views on that feature of their work after they have made a few monthly reports. Form A C, however, can be time-limited by a stamp, while form Local 1 must be punched, which is a decided advantage for the former, where a considerable number must be sold in a short time. There would seem to be little or no objection to limiting form Local 1 by a stamp, though in its present form it can be sold with only one punching if the year and month are punched in a number of tickets beforehand; and this can be readily done if the waste caused by spoiling tickets, which are punched and not used, is not objectionable. The punching to be done by the conductor must be rather slow work. An exchange check from station 123 to station 456 on train 789, required nine punch-marks for these numbers alone. Perhaps, however, the conductors will be so pleased at having private secretaries that they will accept a little additional work with cheerfulness. But the most valuable feature of the new plan is the system of ticket receivers, which officers are so located that every conductor's report is immediately turned in, promptly examined and promptly compared with the agents' reports. This "receiver" system is substantially the same as that in force on the Pennsylvania, where it is regarded as of great value. The Pennsylvania's local tickets are of the usual unlimited or long-time-limited style, but the company finds that so large a proportion of them are used on the same day they are sold, that the checking of the reports is practically effective as a check upon scalping or other "speculation" in tickets. As long as passengers are permitted to enter trains at a dozen places at once, and are not only permitted but required to "step lively" in doing so, the collection of tickets and fares will be hampered by the entire lack of system which now characterizes this branch of railroad work; but it is nevertheless possible to stop much of the stealing of tickets and fares which so disgraces American railroad management, and action like this of the Alton is an important element in the means of doing it. The duplex cash-fare check and the practice of refunding the extra fare collected on the cars are also important, and still other features have been set forth in these columns. All of them deserve the attention of those roads on which wholesale discharges of passenger conductors are now and then heard of.

#### Steam Calorimeters for Locomotive Use.

The continuous use of a steam calorimeter during a locomotive test is probably unnecessary, but an important element of such a test is to determine whether the steam delivered to the steam pipes by the boiler is reasonably dry. If there is less than 2 per cent of moisture at all times, the steam may be considered dry. If there is more moisture than can be shown by a wire drawing calorimeter, then the water line in the boiler should be dropped to give a greater evaporating surface from the water and reduce the velocity of steam from the surface, or the boiler should be increased in size.

When steam is taken from the surface of water in a boiler at a velocity greater than 3 ft. per second, water will generally be carried with the steam. If water is in this way picked up with steam issuing from its surface, it will remain in the steam in a finely subdivided state as a mist, even after the velocity of the steam is reduced to about 1 ft. per second. When the water is entrained, or suspended in the steam, it will generally continue until it is condensed in the pipe or steam engine, or wherever it is used. The object of a steam calorimeter is to show how much water is present in the steam. If too much is found, there are two ways of reducing it in a given boiler without change of structure. One is to increase the area of the evaporating surface of the water and the other to decrease the demand for steam per second. Both of these steps reduce the velocity of the steam from the surface of the water.

Steam calorimeters have many forms, but there are few that are applicable to locomotive work. Condensing calorimeters are, as a rule, too cumbersome for such work. There is an indefinite amount of cooling by the air, and varying conditions, which make them inaccurate. Probably an efficient condensing calorimeter could be devised, but it would require much



fine, thin tubing, arranged in a very compact form, with accurate meters to measure the water used, and thermometers protected from the cooling effect of the air through which the locomotive passes.

The handiest form of calorimeter for locomotive work is what is known as the wire drawing calorimeter. Its action depends upon the observed fact that steam, at say 160 pounds pressure, will, if it is dry and contains no water, have a temperature of about 312 degrees when it is expanded into the atmosphere, to atmospheric pressure. At 160 pounds pressure the temperature is 370 degrees; when expanded as just stated it is at 312 degrees. But steam generated at atmospheric pressure, as in an open dish, has a temperature of 212 degrees. Here, then, we have steam in two conditions; one as just generated from the surface of water in the open air at 212°, and the other as expanded, from 160 pounds pressure, to atmospheric pressure, to a temperature of 312 degrees. The difference between 312 degrees and 212 degrees is called the "superheating"; that is, the steam has more heat in it than is necessary to keep it in the state of steam; or, more strictly speaking, the water which composes the steam has more heat in it than is necessary to keep it in the state of steam.

The superheat, as above, is reduced, if water is present in the steam before it is expanded, because during the expansion of the steam the water it contains will be either wholly or partially evaporated, and to do this heat is required; hence, if we have 1 per cent. of moisture in the steam at 160 degrees, the thermometer placed in the steam after it is expanded to the atmospheric pressure will indicate 20 degrees less than 312 degrees, or about 292 degrees. The approximate law is that for each 1 per cent. of moisture present in the steam before expansion, the thermometer will show a decrease in temperature of about 20 degrees after expansion. Hence, the 100 degrees of superheat is sufficient to indicate the presence of about 5 per cent. of moisture; that is, a wire drawing calorimeter used in steam at 160 pounds boiler pressure will show moisture up to about 5 per cent., and a greater percentage if the boiler pressure is 180 or 200. Of course, if there is enough moisture in the steam to use up the entire superheat, then that portion which is not evaporated will appear in the form of drops of water at the end of the calorimeter, and is to be measured only by some means of collecting it in bulk. Five per cent. of moisture is more than a good modern locomotive boiler delivers with the steam, and therefore a wire drawing calorimeter will answer nearly all purposes of locomotive tests. Accurate readings of the thermometer are hardly necessary for locomotive work in calorimeter tests for the reason that 20 degrees corresponds to 1 per cent., and 1 degree corresponds to  $\frac{1}{20}$  of 1 per cent. Hence, as  $\frac{1}{20}$  of 1 per cent. may be considered sufficiently accurate for all reasonable requirements, any thermometer which will read within one or two degrees is correct enough for locomotive work. The accuracy of the different forms of calorimeters has been admirably analyzed by Prof. C. H. Peabody, and the results are given in the *Transactions of the American Society of Mechanical Engineers*, vol. XI, p. 193.

The wire drawing calorimeter has been best developed by Mr. George Barrus. A description of his work is to be found in the *Transactions of the American Society of Mechanical Engineers*, vol. XI, p. 790. Mr. Barrus has applied the calorimeter to several locomotives. The first, from which the results were published, was the Vaucain compound on the Baltimore & Ohio Railroad. But little entrained water was shown by the results, contrary to the expectations of most railroad men, who believed that nearly all locomotives use decidedly wet steam. We have described the Barrus calorimeter in the *Railroad Gazette*, Nov. 27, 1891, as applied to a locomotive on the Piedmont grade (B. & O.), and have shown wherein that calorimeter, while admirably adapted for uniform conditions, is hardly quick enough in its action for the variable conditions of locomotive work. We also described a form of calorimeter which is quick acting, and perhaps well adapted for varying conditions. Those who desire to read further on the theory of wire drawing calorimeters will find in the paper of Mr. Barrus referred to a good discussion of the principles.

Since the discovery of the phenomenon of the superheating of steam by wire drawing and its application to calorimeter work, there has been disagreement as to the proper position of such a calorimeter in a steam plant. Engineers have advocated various positions—for instance, the steam cylinder, steam chest, centre, side and bottom of the steam pipes, and a perforated pipe through the steam pipe. But a fair sample of the steam cannot be got with certainty from any of these

positions. The steam may, in entering the steam pipes, take on a rotary motion, which may throw the water to the surface of the pipe, leaving comparatively dry steam in the middle. The same thing may happen when the steam passes through the crooked passages of the cylinders to the steam chest. If a large percentage of the water is on the surface of the steam pipe, it is evident that a fair average sample of the steam cannot be collected from that pipe. On the contrary, the steam in the boiler itself near the throttle is comparatively quiescent; at least, it has no rotary motion, and the moisture may be considered as uniformly distributed except in cases where there is a sudden demand for a large volume of steam, and water is lifted in bulk. In such cases there is but little loss of efficiency of the engine, because the time during which the large percentage of water is carried to the cylinders is short. For locomotive work probably the best position for a calorimeter is in the dome under the throttle, in the direct path of the steam from the surface of the water to the steam pipes.

There is another difficulty which arises in the use of calorimeters, which may lead to errors in measurement. It is in getting the proper velocity of flow of the steam into the calorimeter. For instance, if the velocity into the steam pipe is 100 ft. per second, while that into the calorimeter is but 50 ft., it is evident that water could be carried into the steam pipe when it would not pass in the same proportionate quantity into the calorimeter. The only safe condition is to have the velocity of the steam into the calorimeter greater than that into the steam pipe. In this way, if the diaphragm end of the calorimeter be placed near the throttle, and a quantity of water is traveling with the steam, at least a fair sample will be collected by the calorimeter, as the velocity is great enough to carry into it a greater percentage of water than could be carried into the throttle. If the calorimeter can take steam with sufficient velocity to carry the same percentage of water that is carried by the steam going to the throttle, its indications may be correct.\* To accomplish this certainly it is better that the diaphragm with its small perforation, through which the steam is wire drawn, be placed at the interior end of the calorimeter pipe, and directly in the path of the steam. In this way the maximum velocity of steam flowing from boiler pressure to atmospheric pressure will be attained directly at the point where steam enters the calorimeter. Hence no questions can arise as to the velocity of the steam entering the calorimeter being sufficient to carry as great a percentage of moisture as the steam can carry which is passing through the throttle. Such a location of calorimeter as this is described in the *Railroad Gazette*, Nov. 27, 1891.

Locomotive operation is variable. Within less than half a minute the steam consumption may vary from zero to its maximum; and if the moisture carried by the steam under these variable conditions is to be measured, the calorimeter must be an extremely sensitive instrument, the thermometers should be quick acting, and their bulbs should be placed directly in the expanding steam without intervening mercury or oil cups. Even then, while the rise or fall of the thermometer will be very rapid, yet for close measurements it will be necessary to determine a constant, showing the rate of rise or fall. Such a method was described by Mr. A. F. Nagle in "Tests of Thermometers used for the Determination of the Melting Point of Automatic Sprinklers." This paper was read at the last meeting of the American Society of Mechanical Engineers and published in the *Railroad Gazette* Nov. 27, 1891.

There is another advantage in placing a thermometer in this way, as, if there be any doubt regarding the steam pressure or the accuracy of the steam gauge, the valve outside of the thermometer can be closed and the bulb be placed in contact with full boiler pressure. As a test for a locomotive steam gauge this is extremely convenient, and in one instance a thermometer showed the steam gauge to be over five pounds in error, yet this steam gauge had been previously calibrated by a shop test gauge, which was thus found to be also in error. In making this test it is necessary to hold the thermometer in the stuffing-box by means of the thumb and fingers; otherwise, it will blow out. Sufficient pressure cannot be safely put on the thermometer to hold it in by friction of the stuffing-box unless great thickness of packing be used.

Calorimeter work on a locomotive is simple and easy when the apparatus is conveniently located, and the accuracy of a wire drawing calorimeter, when handled with ordinary care, is undoubtedly all that is required for such locomotive tests as are needed for business purposes.

\* The small amount of steam taken by the calorimeter has practically no effect in increasing the volume of steam used per second.

#### December Accidents.

Our record of train accidents in December, given in this number, includes 125 collisions, 101 derailments and 8 other accidents, a total of 234, in which 85 persons were killed and 331 injured. The detailed list, printed on another page, contains accounts only of the more important of these accidents. All which caused no deaths or injuries to persons are omitted, except where the circumstances of the accident as reported make it of special interest.

These accidents are classified as follows:

COLLISIONS:	Rear.	But- Crossing ting. and other.	Total.
Trains breaking in two.....	12	1	13
Misplaced switch.....	1	1	2
Failure to give or observe signal.....	18	4	22
Mistake in giving or understanding orders.....	1	5	6
Miscellaneous.....	11	4	15
Unexplained.....	28	7	35
Total.....	71	21	92

DERAILMENTS:	Total.
Broken rail.....	5
Loose or spread rail.....	6
Broken bridge.....	2
Defective switch.....	2
Defective frog.....	1
Broken wheel.....	3
Broken axle.....	4
Broken truck.....	8
Broken car.....	2
Fallen brakebeam.....	2
Broken drawbar.....	1
Loose wheel.....	1
Misplaced switch.....	2
Careless running.....	1
Bad loading.....	2
Failure to observe signal.....	1
Animals on track.....	4
Landslide.....	3
Malicious obstruction.....	2
Purposely misplaced switch.....	3
Unexplained.....	46
Total.....	101

OTHER ACCIDENTS:	Total.
Cylinder explosion.....	2
Car burned while running.....	1
Breakages of rolling stock.....	1
Other causes.....	4
Total.....	8

Total number of accidents..... 234

A general classification shows:

	Col- lisions.	Derail- ments.	Other acc'd's.	Total.	P. c.
Defects of road.....	16	1	18	7	14
Defects of equipment.....	13	21	3	37	16
Negligence in operating.....	62	6	1	69	30
Unforeseen obstructions.....	12	4	16	7	42
Unexplained.....	30	16	96	42	
Total.....	125	101	8	234	100

The number of trains involved is as follows:

	Col- lisions.	Derail- ments.	Other acc'd's.	Total.
Passenger.....	37	28	7	72
Freight and other.....	201	74	1	276
Total.....	238	102	8	348

The casualties may be divided as follows:

	Col- lisions.	Derail- ments.	Other acc'd's.	Total.
KILLED:				
Employees.....	17	1	1	19
Passengers.....	16	1	1	18
Others.....	6	1	1	8
Total.....	39	3	3	45
INJURED:				
Employees.....	108	63	1	172
Passengers.....	40	117	1	158
Others.....	2	2	1	5
Total.....	150	182	3	335

The casualties to passengers and employees, when divided according to classes of causes, appear as follows:

	Pass. killed.	Pass. injured.	Emp. killed.	Emp. injured.
Defects of road.....	1	76	6	22
Defects of equipment.....	1	14	1	3
Negligence in operating.....	16	42	48	112
Unforeseen obstructions and maliciousness.....	2	2	2	19
Unexplained.....	25	6	6	25
Total.....	45	157	63	172

Thirty-six accidents caused the death of one or more persons each, and 57 caused injury but not death, leaving 141 (60 per cent. of the whole) which caused no personal injury deemed worthy of record.

The comparison with December of the previous four years shows:

	1891.	1890.	1889.	1888.	1887.
Collisions.....	125	82	90	64	92
Derailments.....	101	111	67	61	83
Other accidents.....	8	14	11	7	7
Total.....	234	207	168	132	182
Employees killed.....	62	35	44	41	37
Others.....	23	18	8	5	11
Employees injured.....	172	104	122	72	87
Others.....	150	79	52	65	124
Passenger trains involved.....	72	80	50	56	79

Average per day:					
Accidents.....	7.55	6.68	5.42	4.39	5.87
Killed.....	2.71	1.71	1.68	1.48	2.29
Injured.....	10.68	5.90	5.61	4.39	6.80

Average per accident:					
Killed.....	0.263	0.256	0.309	0.338	0.300
Injured.....	1.415	0.884	1.036	1.000	1.150

The worst accident in December, that at Hastings, N. Y., on the 24th, has been discussed in previous issues. The only other cases in which a passenger was killed in a passenger car were those at East Thompson, Conn. on the 4th, and at Lima, O., on the 16th. In the former, there was no trace of the body of the victim after the burning of the wreck except his watch and keys, and the railroad officers for a time refused to believe that any person had been burned. The rail which broke at Lima had been in use only two or three years and had no outward flaw.

The derailment at Mott Haven, N. Y., on the 2d caused much discussion, for the reason that, although the wheels undoubtedly jumped the track at the switch, there was no evidence of damage to the rails, the lock or the detector bar. It seems that it is possible to unlock a switch without lifting the bar, the power (pneumatic) being strong enough to strain the connections and parts sufficiently to do this.

The investigation of the collision of Dec. 3, at Pen-

nington, N. J., before the coroner's jury, resulted in considerable discussion as to the value of high targets for switches, and the jury held the road negligent in not putting such a target on the trailing switch, at which the collision occurred, as well as on the facing point switch at the other end of the same side-track. But the brakeman of the work train testified that he swung a white light to stop the passenger train, and the real points at issue are whether this light was swung soon enough and whether the passenger runner quickly responded to it. Where a train is backing in to a side track and is compelled to move slowly, as was the case at Pennington, the switch is pretty sure to be set right some seconds before the engine clears the main track, so that a high target may do harm instead of good, as it gives a clear signal when the track is, nevertheless, obstructed very near to it. The true protection for a switch, whether it be a facing or a trailing point, is a distant signal; and such a signal, if placed at a proper distance, need not be so very high. With a suitable location 15 ft. would doubtless be, in a great majority of cases, as convenient and as safe as 25 ft.; and the lower the fixed signal the less excuse will a runner have for failing to see a hand signal. Even with a distant signal it is necessary to caution men not to change it from danger to safety as long as the track is fouled by anything; but this regulation is more easily enforced than it could be with a switch and target which are both moved by the same lever.

Among the remarkable or curious accidents of the month were the butting collision at Lofty, Pa., on the 18th, where it was found impossible to rescue the victims for two or three hours; the rear collision at West Manayunk, Pa., on the 11th, where a brakeman was called in just at the wrong time; the rear collision near Cresco, Penn., on the 19th, and that at Baltimore, Md., on the 20th; the derailment near Brenham, Tex., on the 15th, and that at Marquette, Mich., on the 9th.

A collision of electric cars on the St. Louis & Suburban road in St. Louis on the 13th, in a fog, resulted in the serious injury of six persons. An electric street car was struck by a Lake Shore & Michigan Southern locomotive in Buffalo on the 30th and a man injured. Horse cars were struck by trains in Philadelphia on the 14th, Grand Island, Neb., on the 5th, and Nashua, N. H., on the 17th. Near Leroy, Mo., on the 9th, a lady passenger in a moving train of the Chicago, Rock Island & Pacific was badly injured by a gun-shot fired by some person outside the train.

On the 17th near Leadville, Colo., three railroad employes were killed and two injured by the explosion, in a tunnel, of a charge that had been placed there long ago when the tunnel was made. Three trackmen were killed by a train on the Long Island road on the 8th. In Jamaica, N. Y., on the night of the 30th, a steam shovel in a freight train struck three overhead bridges, tearing down all of them and cutting off an important water supply.

The Russian Ministry of Transportation has for some years collected and published statistics of transportation by rail and by water which have become very valuable and have a signification in other countries as well as Russia. The railroad freight tonnage increases from year to year, and on the whole with considerable rapidity. Beginning with 21½ million tons in 1880, it reached 26½ millions in 1883, 30½ in 1887, and 34½ in 1889. The latter was not one-fifteenth our tonnage, but Russia had but one-twelfth our railroad mileage. No less than 45 per cent. of the shipments in 1889 were through shipments. In 1888 no less than 29 per cent. of all the railroad freight was grain; in 1889, when the crops were not so good, 22½ per cent. was grain. In 1888, 124 million bushels of wheat were shipped, and the equivalent of 36 millions more in the form of flour, and the rye shipments were more than half as great as the wheat shipments, and as many as 130 million bushels of oats were carried. The coal shipments amounted to only about 6,200,000 short tons, and the wood and lumber shipments to a little more. The railroads received at seaports or at stations on the border of foreign countries 4,280,400 tons of freight and carried to them 10,600,200 tons in 1889. More is carried to the Black Sea (including the Sea of Azof, which opens into the Black Sea) than to the Baltic, but not always much more. The total deliveries at border stations, whence they must be forwarded by rail, were but 1,866,400 tons in 1889 (four-fifths on the Prussian border), while 3,168,000 went to Baltic ports, 4,428,000 tons to Black Sea ports, and 1,257,800 tons to Azof ports. The greatest interior market is Moscow, which received 3,861,000 tons and shipped 797,400 in 1889. Wheat is carried an average distance of 205 miles, wheat flour 317 miles, rye 340 miles, oats 526 miles, coal 208 miles, and petroleum 578 miles. Although Russia has many large rivers and several canals, and one very important one connecting the Volga with St. Petersburg, the internal traffic by water is not one-third that on its 18,000 miles of railroad, and it has grown comparatively little. From 1880 to 1885 it remained almost stationary at between 8,800,000 and 9,300,000 tons; but it increased yearly then and reached 11,000,000 in 1889—always excluding lumber, the figures for which were first collected in 1888, showing the respectable sum of 9,889,000 tons that year and 10,771,000 in 1889—that is, as much as all the other water transportation, which includes about 123 million bushels of grain of all kinds,

about two-thirds of which was moved on the Volga and the water lines with which it is connected, namely the canals, Lake Onega, the Neva and the Dwina. The water routes delivered 2,365,000 tons of freight to the railroads, the railroads only about one-fourth as much to the water routes.

The Southern Railway and Steamship Association has been enlarged by the accession of the roads in Kentucky, Tennessee, Alabama and Mississippi, which have for some years kept out of it, and these, in coming into the association, are joined by those with which they have been associated in the Southeastern Mississippi Valley association, an organization that does not seem to have amounted to much, and which is now abolished. This makes the old association a very strong one, as far as membership is concerned, all the important roads in southern territory, except the Chesapeake & Ohio, being within its fold. The new members are the Cincinnati, New Orleans & Texas Pacific; the Illinois Central; the Louisville, New Orleans & Texas; the Newport News & Mississippi Valley (western division); the Louisville & Nashville; the Memphis & Charleston; the Alabama Great Southern; the Georgia Pacific; the Mobile & Ohio; the Kansas City, Memphis & Birmingham; and the Baltimore Steam Packet Company. It appears that in order to conciliate all interests it was necessary to have new officers, and Commissioner Carter and Secretary Sindall resigned before the new members came in. The new commissioner is to be Mr. E. B. Stahlman, late Vice President of the Louisville & Nashville, and the Secretary will be Mr. A. Pope, General Freight Agent of the Norfolk & Western. They will assume their duties on the first of February, but it is said that the old officers will remain with the association for a time. Experience has shown that there is no use in trying to maintain two associations in the southern territory east of the Mississippi, for the reason that there is no natural dividing line. The "Queen & Crescent" and the roads west of it hardly need an association for themselves alone, and as soon as questions arise involving territory further east the necessity of co-operating with the older association at once comes in. These latter questions being the most important of any, the existence of two associations has resulted only in unnecessary friction. A change in rates serious enough to demand arbitration would take that course in both associations, and then the two results, being almost sure to disagree, would have to be the subject of a further compromise.

These delays and inconveniences seem to have been the cause of the attitude of the East Tennessee, Virginia & Georgia system, which, being in the position to suffer most from undue friction, has given sundry notices of withdrawals from the associations during the past year. But now all seems to be serene.

On Thursday of last week Senator Cullom introduced another bill in the United States Senate concerning automatic couplers and brakes, the provisions of which are in refreshing contrast to those of the crude bills previously presented. They are as follows: Roads subject to the Interstate Commerce law must not, after Jan. 1, 1897, haul any freight car engaged in interstate commerce unless it is equipped with automatic couplers which will "couple by impact," without the necessity of a person going between the cars, and so constructed as to be uncoupled without going between the cars. From the same date it shall be unlawful to haul such a car unless it has brakes that can be "set and unset," at any time, from the locomotive hauling the train. Driving wheel brakes must be provided on all freight engines after Jan. 1, 1893. Temporary disuse of these safeguards, in case of emergency, is provided for. The penalty for violation of the law is \$100 for each offense. The Interstate Commerce Commission may, in special cases, extend the time for compliance with the law, not exceeding two years.

It appears that this law was drafted by Commissioner Rogers, of New York, and this action was taken by him because the committee of state railroad commissioners, of which he is a member, has failed to come to an agreement. Commissioner Crocker, of Massachusetts, who was chairman of this committee, is now out of office; but the Legislature of Massachusetts appointed a special commission of three men to go to Washington and urge this legislation upon Congress, and it is stated in the Boston papers that this commission will take up the matter within a few weeks. Mr. Crocker was a member of the commission, but a new man will probably be appointed in his place. Mr. Rogers' bill, it will be observed, says nothing about uniformity nor anything about types, either of couplers or brakes. He assumes that the Master Car Builders' coupler is sure to become universal, and evidently holds the same view with regard to the automatic air brake. The proposed compulsion, therefore, is about the same as that prescribed in the English law of 1889, in that it simply aims to make universal what is already, or soon will be, under natural influences, almost universal.

The city of Chicago has a new excitement. It is a boiler explosion. It occurred on Jan. 8 and five men were killed. Investigation has shown that the exploded boiler was in bad condition, and was known to be so not only by the city boiler inspector but by the owner of the steam plant. Further investigation has shown that between 300 and 500 other boiler plants in Chicago are in

just as bad condition. That is, about this number of boilers have been found by the inspectors to be in such condition as to warrant the refusal of a license to run them. Yet they are still in operation and the daily papers are making a noise about this evident injustice to the public. Those who are familiar with the details of boiler operation will be surprised to learn that even in Chicago, where development has been so rapid as to prevent much consideration of a good many small matters, a plant of 17 boilers, 60 in. in diameter and 16 ft. long, could be allowed to run in the condition in which they were found by the inspector as shown by his books. Four boilers out of the 17 were in fairly good condition. The one which exploded had a bad bulge in the bottom of the back sheet, probably the result of a collection of mud, and was ordered to be patched, but had not been repaired. Another of the same lot had a similar bulge in the back sheet, and the boiler was ordered to be taken out. All of the boilers needed pop valves and the 17 boilers in the plant were without safety plugs. On the first day of November last the inspector refused a certificate and ordered the repairs we have just mentioned. Yet on Jan. 8 nothing had been done toward following his instructions, and, naturally enough, one of the boilers exploded. The Mayor is much exercised, and has recommended that a new ordinance be passed which will prevent any owner of a boiler plant using a boiler without a certificate. This it is stated is not accomplished by the present ordinance.

The new Austrian passenger tariff, known as the "kreuzer zone tariff," went into effect on the State railroads June 16, 1890. The following is a statement of the results of this tariff during the first year it was in force compared with those of the previous year. The year, however, begins with July, so that there are 15 days of the new tariff in the year 1889-90. Paris tickets, which were extraordinary in 1889, have been deducted in the following table:

	1889-91	1889-90	Inc. or Dec.	P. C.
No. passengers.....	29,766,512	20,750,147	Inc. 9,016,365	43.4
Tons baggage.....	52,679	55,175	Dec. 2,497	4.5
Receipts from passengers, florins.....	14,140,541	14,859,717	Inc. 719,176	5.1
Baggage.....	9,667	628,978	Inc. 278,021	44.2
Premium.....	125,240	274,460	Dec. 149,220	32.5

Total..... 15,232,754 15,763,055 Inc. 530,301 3.6  
\*Austria has a depreciated currency, and the railroad charges are collected in the equivalent of coin.

The number of passengers thus increased 43 per cent., while the passenger earnings increased 2 per cent. The great increase in baggage earnings was due to the abolition of free baggage. By the old tariff, when 55 lbs. were carried free, each passenger on the average had in the baggage car only 5½ lbs. of baggage, but when he had to pay for it he took only 3½ lbs. This, however, is noticeable chiefly as indicating that only a small fraction of the passengers, even under the old régime, carried anything but hand baggage with them. The increase in total passenger train earnings, 3 per cent., was doubtless not equal to the additional expense of the enormously increased traffic, but it is a very satisfactory return for the first year of a traffic so greatly reduced.

The numerous legislators who are eager to compel the grasping railroad monopolies to contribute their share toward the support of the government are respectfully referred to Spain, where in 1889, 4,420 miles of railroad were made to contribute about \$1,500,000 to the state treasury, or at the rate of \$1,000 per mile—much more than the net earnings of many roads. Nearly one-third of this amount was produced by a tax on railroad tickets, and about one-seventh by a tax on freight way bills—which taxes, of course, were simply added to the rates charged by the railroad companies. Besides there was collected about \$150,000 for the government's inspection and surveillance, \$250,000 by a tax on dividends, a small amount by a tax on the wages of railroad employes, another by a tax on new issues of shares and bonds, and another by the duties on imports of railroad materials. A very large part of the railroad's contributions to the government, however, are of the nature of "pay in trade," namely, \$900,000 by carrying mails, \$750,000 by carrying soldiers and sailors of the navy, \$800,000 by military freight, and smaller amounts by carrying convicts and by managing and maintaining the government telegraph lines. On the whole, the government gets much more out of the Spanish railroads than the shareholders do. The shareholders of the Northern Railroad in 1889 received 2.31 per cent. on their stock, amounting to about 11 francs per share, while the railroad contributed to the government at the rate of 28 francs per share. From the Madrid, Saragossa & Alicante the stockholder received 12 francs per share (2.53 per cent.) and the government 12½ francs; from Andalusian railroads the shareholder 20 francs (4 per cent.), and the government 40½. The other two companies paid nothing to their shareholders, but contributed considerable sums to the government.

The Governor of New York has appointed as State Railroad Commissioner Mr. Samuel A. Beardsley, of Utica. Of his qualifications we know little, but there are indications that the appointment is political. But, in spite of politics, Mr. Beardsley may make a good commissioner; we hope so at any rate. He succeeds Mr. Wm. E. Rogers, who has been the Chairman of the Commission several years, and who has been in the main a valuable public servant. We have often had occasion (or have thought we had) to criticize the findings of the



Commission under Mr. Rogers' chairmanship. But we have frequently thought that our differences came from different conceptions of the relations of railroads to the state, to the public and to each other. Mr. Rogers' energy, zeal and high sense of duty we have never doubted. The narrow limits of the powers of the New York Commission have chafed his aggressive and active spirit, and have restricted his influence, but under his administration the Commission has accomplished some excellent things.

In that part of city government which includes all the branches of municipal engineering, the affairs of no other large city of the United States have been better administered, the last dozen or more years, than those of St. Louis. That city has enjoyed unusual freedom from incompetence, extravagance and corruption in its public works, and we are glad to be able to give, on another page, Mr. Robert Moore's lucid statement of the system under which the emancipation of the city engineers from politics was brought about. We believe, however, that, quite recently, partisan appointments have lowered somewhat the quality of the board of public improvements; but the good system remains in force, and the people have learned so much of the possibilities of non-political city engineering that a return to the old conditions is improbable if not impossible. Mr. Moore's paper was part of an important discussion of the subject before the Boston Society of Civil Engineers, in which the systems of several American and European cities were described.

The *Financial Chronicle*, in its review of railroad gross earnings for the year 1891, gives the following table:

	Gross earnings—	Miles worked—
	1891.	1890.
118 roads, 12 mos.	\$92,098,932	\$58,943,718
33 " " "	378,357,135	367,659,293
Total.....	\$940,456,097	\$906,603,011

The increase, \$418,853,089, is 4.89 per cent, and the increase of mileage is a little less than 3 per cent. This gain in 1891 followed a gain of \$70,500,000 in 1890. The grain carrying roads were, of course, the largest gainers last year, but the increase was pretty well distributed.

Periodically the subject of a standard locomotive for all roads is taken from the table and the old talk is reiterated by some one who thinks he has a happy idea that will reduce the first cost and simplify repairs. There are two essential conditions necessary to much enthusiasm on this subject. One is a profound ignorance of the varieties of service and fuel in this country, and the other a conviction that the ideal standard design is clearly outlined in the mind of the enthusiast and needs only tools and paper to allow it to blossom forth and astonish mankind.

#### NEW PUBLICATIONS.

Messrs. John Wiley & Sons announce as in preparation *Elementary Lessons in Heat*, by Prof. S. E. Tillman, and an *Elementary Course in the Theory of Equations*, by Prof. C. H. Chapman.

*Machinery Pattern Making*. By P. S. Dingey, 90 pages, 12mo. and 376 illustrations. New York: John Wiley & Sons. Price \$2.

In this volume Mr. Dingey has collected a series of articles which were first published in the *American Machinist*. The articles consist of some general chapters on pattern making, pattern shops and records of patterns, and a good many special articles on patterns for various machines and parts. Among the illustrations are full sized profiles of gear teeth from Prof. S. W. Robinson.

#### TECHNICAL.

##### Manufacturing and Business.

The Berlin Iron Bridge Co., of East Berlin, Conn., is completing a new machine shop for the Bridgeport Machine Tool Co., at Bridgeport, Conn. The building is made entirely of brick and iron, divided into two parts each 40 ft. wide, the total length being 96 ft. One portion is two stories high, the roof and floor being designed for light work; while the opposite half of the building is of the same height but the second floor is omitted so that it may be used as an erecting shop. The erecting shop is controlled by a traveling crane. The building when completed will be one of the most perfect and best designed machine shops in the New England States.

The Multiple Speed and Traction Co., has opened an office at 140 Nassau street, New York City, in charge of Mr. N. H. Furness, who will exhibit a model of the multiple speed and traction railroad, more generally known as the movable sidewalk railroad.

The Laidlaw & Dunn Co., of Cincinnati, is building two compound pumping engines with boilers for the town of North Attleboro, O.

The Trustees of the New York Locomotive Works have issued a circular stating that the appointment of temporary receivers last week was caused by the depression in the business of the works for the last two years, the failure of the plan for an increase of the capital stock announced last June, and the suits for judgments brought by creditors. To secure an equal distribution of the remaining property of the corporation, application was made for the appointment of receivers.

The McSheffry Mfg. Co., of Dayton, O., has reorganized with the following officers: President, C. B. Oglesby, Middletown, O.; Vice-President, P. J. Sorg, Middletown; Secretary, E. C. Boyer, Dayton, O., and Treasurer, L. Sebald, Middletown, O. This company manufactures the Maxon patent jack.

The Structural Steel Company, of Duluth, Minn., will build a large plant at Ironton. The main building will be 700 x 60 ft. and the total cost of the plant will be \$400,000. The open hearth process will be employed and the machinery will be the most improved pattern. James E. York is in charge of the work.

#### Interlocking.

The National Switch and Signal Co. has taken a contract for a 12-lever machine for the Dutchess County Railroad. It is to signal and interlock the crossing of the Newburg, Dutchess & Connecticut Railroad at Hopewell, N. Y.

#### Iron and Steel Roofing.

At the sixth annual meeting of the Iron and Steel Roofers held in Canton, O., President Aldrich asserted that at least 50,000 tons of sheet iron, 20 to 28 Birmingham gauge, were converted into building material last year, an output valued at \$3,500,000. The meeting decided on a joint display at the World's Fair and it was resolved that the following weights be adopted as approximate weights for 28-in. sheets, with 2½ corrugation: No. 28, 87 lbs.; No. 27, 94 lbs.; No. 26, 101 lbs.; No. 24, 114 lbs.; No. 22, 141 lbs.; No. 20, 188 lbs.; No. 18, 221 lbs.; No. 16, 287 lbs. It was further resolved that the approximate weights of painted galvanized iron corrugated and other roofing be as follows: No. 27, 72 lbs.; No. 26, 81 lbs.; No. 24, 98 lbs.; No. 22, 123 lbs.; No. 20, 153 lbs.; No. 18, 214 lbs.; No. 16, 283 lbs.

#### New Station and Shops.

The Quebec & Lake St. John, and the Quebec, Montgomey & Charlevoix railroads have just completed a large union station at Quebec.

A contract has been awarded by the Norfolk & Western to J. P. Pettyjohn & Co., of Lynchburg, Va., for the construction of machine shops at Lambert's Point, Va.

Ryaa & McDonald, of Baltimore, will commence work next week on the grading for the new yards and shops of the Baltimore & Ohio at Cumberland, Md. It is the plan of the company to make Cumberland the terminus of three divisions of the road with repair shops and complete terminal facilities. The yard will be 4,600 ft. long on one side and 3,400 ft. on the other. It will be 650 ft. wide at the lower or larger end where the shops are to be located. The average amount of excavation necessary to grade the land is 12 ft., and 200,000 cu. yds. of earth will have to be removed.

#### Car Heating.

The Morton Safety Car Heating Co., of Baltimore, has received an order to equip the cars of the Baltimore & Lehigh Railroad with its system of storage heating. The Pleasant Valley, Allegheny & Manchester Electric Railroad now has 116 cars equipped with the Morton system of heating. The company has recently contracted to equip the cars of the Attleboro, North Attleboro and Wrentham street railroad in Massachusetts.

#### The Goldie Spike.

The interest which is felt in improved track spikes is indicated by the success with which several of the patented spikes are meeting. We are informed that last year the Goldie spike made up a very important percentage of the total quantity of the standard 5½ x 7½ in. spikes which were used in the United States. It is now in use on over 160 roads, which is remarkable progress, as it has been on the market but a little more than two years. In December, 600 tons of this spike were sold to the New York Central. The machinery at the works of Dilworth, Porter & Co. can now turn out 150 tons of Goldie spikes a day. Mr. Goldie has devised a rolled steel tie plate which will shortly be put on the market by the same firm.

#### A Second Whaleback to Go Around Cape Horn.

Another of the American Barge Company's "Whalebacks," the "E. B. Bartlett" will be sent around Cape Horn to join the "Wetmore" in the Pacific coast business. She will be loaded with machinery and supplies for the company's ship yard at Everett, Wash.

#### The Accident at the Wheeling Bridge.

The accident at the stone arch bridge, at which Mr. Carey, the contractor, lost his life, occurred on Thursday last. The arch has been completed, but the false work has not been removed. On Wednesday the creek rose very rapidly, and about the abutments of the bridge the water was 20 ft. deep and running very strong. Drift wood had lodged against the timbers of the false work under the arch and under a tramway that had been built across the creek to carry stone to the work. Mr. Carey was superintending the work of clearing out this debris, and noticing that the tramway was weakening, he ordered a number of laborers off the trestle. Desiring to see just what condition the work was in he descended to the tramway. A huge block of stone was standing on a car on the tramway and as he stepped alongside the timbers gave way, throwing him and the stone and car into the creek. As Mr. Carey fell the stone struck him in the back. Divers were sent down to search for the body, but after three days' work they gave up all hope of finding the remains till the flood shall have subsided.

#### Chignecto Ship Railway.

The Canadian Government has denied the recent application of the contractors and chief engineer of the Chignecto Ship Railway that the government begin the payment of the Dominion subsidy next July or provide for the payment of interest on the bonds accruing at that date. The subsidy promised by the government was \$170,000 for 20 years, but it was not to begin until the completion of the work.

#### Freight Car Trucks.

The Master Car Builders' Association issues the following circular of inquiry:

Do you use rigid or swing bolster truck?  
Do you prefer rigid or swing bolster truck, and what are your reasons for such preference?  
What has your experience been in the cost of maintenance of each kind of truck?  
Have you any of the Fox pressed steel trucks in use, and what has been your experience with them?  
How do you consider the Fox pressed steel truck compares with the diamond truck for 60,000-lb. cars now in use?  
Replies to these questions should be sent to Geo. F. Wilson, Superintendent Motive Power and Equipment, C. R. I. & P. R'y, Chicago, before Feb. 15, 1892.

#### THE SCRAP HEAP.

##### Notes.

Thirty-five electric street cars were burned, together with a large brick building, at Toledo, on Tuesday last.

The Grand Trunk Railway has bought out the Canadian Express Co., which hitherto has done the express business on the lines of the road.

The dining cars on the Lake Shore & Michigan Southern are to be operated after Feb. 1 directly by the railroad company instead of by the Wagner Palace Car Co.

A law establishing a railroad commission is proposed in Maryland as well as in Virginia. In the latter state President Kimball, of the Norfolk & Western, appeared before the legislative committee and made an elaborate argument in opposition to the bill.

The Wagner Palace Car Co. has been suffering from thefts of sleeping car and dining car supplies and fixtures for several months and has finally arrested at New York a discharged porter who is claimed to have stolen several hundred dollars' worth of silverware and linen.

The West Shore road is extending and improving its block system. New stations are being put in between Jacksonburg and Mohawk, at Syracuse, East Buffalo and other places. Six offices on the Buffalo Division which have heretofore been open during the daytime only will be made day and night offices.

The New York, Providence & Boston is more fully equipped with automatic electric signals than any other road in New England except the Boston & Albany and perhaps the Old Colony. On the main line (Providence to New London) the sections (the clockwork system) are continuous from Providence to Auburn, from Kenyon's to Carolina and from Westerly to Stonington. Most or all of the stations outside these sections have one signal each, on each main track. The new line built to connect with the bridge at New London is fully equipped. The company is now putting in new clockwork signals at several places.

Mexico is already at the head of the list in some departments of railroading, and now it appears that she aspires to excel in another direction. A City of Mexico paper states that on Jan. 2 regular passenger train No. 4 of the Mexican Railroad, engine and seven cars, made the 3½ miles from La Palma to Otumba in three minutes.

The San Antonio & Aransas Pass road seems to be doing its business in fair shape, though the press dispatches keep up the talk about the strike. There were threats that trainmen on other roads would refuse to handle cars coming from or going to the S. A. & A. P. and several committees of such men passed "resolutions," but this seems to be the only excuse for continuing the publication of this kind of "news" in the papers. There have apparently been few, if any, actual refusals.

Severe cold weather and snow prevailed over a large part of the country on Tuesday and Wednesday of this week, trains being delayed by snow as far south as St. Louis. Of the 23 mail trains due in Chicago Tuesday morning from all points 14 had up to noon failed to arrive, and not one of them was on time. Traffic on the Louisville & Nashville was interrupted six days, Jan. 12-17, by floods south of Montgomery. The Queen & Crescent also had trouble and on the Georgia Pacific a bridge was undermined.

A Toledo paper states that the Columbus, Hocking Valley & Toledo, Panhandle and Big Four railroads will advance the wages of their yard men the coming month. The first two roads will pay men in their yards for 12 hours' work \$2.10, an increase of 12 cents; night men, for 12 hours' work, will receive \$2.22, an increase of 15 cents. Day foremen will receive \$2.75 per day, and night foremen \$2.86. The day workmen for the Big Four will receive an advance of 5 cents, and the night men an advance of 7 cents. This increase was made voluntarily, and is all the more appreciated by the men.

Philadelphia papers announce an increase of pay on the Pennsylvania Railroad affecting conductors, baggage masters and brakemen on the New York Division. A notice is posted to the effect that, dating from Jan. 1, the increase, as follows, will go into effect: Conductors,



\$3.25 to \$3.50 per day; baggage masters (local), from \$1.75 to \$1.90; baggage masters (through), from \$1.90 to \$2.10; brakemen, from \$1.65 to \$1.80. The increase averages about 10 per cent. It does not appear how many miles constitute a day's work.

Several attempts to derail trains have been made on the New York, New Haven & Hartford at and near Fairfield, Conn., during the last two weeks, and in one or two cases engines and cars have been damaged, though no train has yet been thrown off the track. The investigations of the police indicate that discharged Italian laborers are responsible for the work. Most of the obstructions have been of such a nature as to indicate that the aim was to intimidate the company rather than to produce a bad wreck.

A supplementary contract between the city of Buffalo and the New York Central & Hudson River road concerning the grade crossing improvements in that city has lately been made, and it is said that work will be commenced before long. The recent delay has been largely due to a contest in the courts over the damages for invading or discontinuing certain streets. It is said that the basis for the payment of most of the street crossing improvements is as follows: The railroad company to pay for all work on its own premises and two-thirds of the cost of approaches and of alterations in streets.

#### The Year's Shipments of Lake Superior Ores.

The total shipments for 1891 were 7,062,233 gross tons, which according to the Ishpeming Iron Ore is 1,961,347 tons short of the shipments of 1890. The losses and gain are as below:

	Gain.	Loss.
Marquette.....	502,148	
Menominee.....	457,685	
Gogebic.....	1,013,039	
Vermillion.....	10,285	

The shipments from the different ranges were:

From Marquette.....	2,511,395
" Menominee.....	1,824,552
" Gogebic.....	1,834,747
" Vermillion.....	891,539

Total..... 7,062,233

And the shipments from ports were:

From Escanaba.....	3,054,590
" Marquette.....	1,033,027
" Ashland.....	1,261,658
" Two Harbors.....	890,299
" Gladstone.....	132,222
By all rail.....	663,437

Total..... 7,062,233

Each of the ranges made all rail shipments. The Marquette range leading with 300,723 tons, the Vermillion range sending only 1,240 tons through to consumption by rail. The shipments, however, are not an exact gauge of the ore produced as a great deal of ore is stocked in hope of higher prices this year. The Colby, for instance, is said to have over 100,000 tons in its stock pile.

#### For a Canal Between Philadelphia and New York.

A meeting of the New York Board of Trade and Transportation, held on the afternoon of Jan. 13, was addressed by Mr. Thos. C. Martendale, of Philadelphia, and Prof. Lewis M. Hanpt, of the University of Pennsylvania, in favor of a canal following the general course of the Delaware and Raritan Canal, but leaving out Trenton and from the twentieth mile from the Delaware following the Lawrence Brook to Raritan. Professor Haupt's idea of the cost of this canal, enlarging the bed of the present canal to a prism of 90 ft. in width on the bottom with 20 ft. depth, and making the new parts of of the same prism, is \$12,500,000. This estimate includes six locks 500 by 60 ft.; two tidal locks and four lift locks to overcome an elevation of 50 ft. The total length of the canal will be 33.74 miles. Mr. Martendale showed reasons for estimating the saving on the coal freights of this city from the Schuylkill coal fields at 50 cents per ton. This would pay nearly 25 per cent. on the estimated cost. In the course of statements showing the growth of the country the following table, which was vouched for as the result of careful examinations of building records, is given, showing the number of houses built during the past five years in the cities named.

Philadelphia.....	42,170	Pittsburgh.....	13,715
Brooklyn.....	20,111	Boston.....	9,525
New York.....	17,997	Baltimore.....	7,776

Attention was called to the fact that Philadelphia built more houses than New York and Brooklyn. At the close of the addresses Mr. Wiman moved that Congress be asked to appropriate \$25,000 for surveys to establish the cost of the canal, which, after some opposition from Mr. O. B. Potter, was passed.

#### Texas Railroad Statistics.

A compilation of statistics by Mr. Asken, of the State Railroad Commission, shows a total in the state of 8,793 miles of road and 855 miles of sidings—an increase in the past two years of 228 miles. The railroads paid last year state, county and municipal taxes amounting to \$890,000. The assessed valuation of the roads and rolling stock is \$92,000,000. The reports of the roads show "overcharges refunded" by the Texas & Pacific \$221,000, and by the Atchison, Topeka & Santa Fe, \$101,000.

#### Sleeping Car Taxes in Kansas.

The Pullman Palace Car Co. for some years has refused the payment of taxes in Kansas on the ground that taxes were paid in Illinois on the stock of the company, but in a suit brought by the Attorney General in the United States Supreme Court a decision has now been rendered that the state taxes must be paid and the Attorney General has instructed the treasurers of 60 counties to collect from the Pullman Co. the penalties and interest at the rate of 50 per cent. per annum, making a total, it is said, of more than \$100,000. The amount would have been larger had not the Union Pacific Railway paid the taxes annually under protest, thereby saving the penalties.

#### Mining on the Gogebic Range in 1891.

The season of 1891 on the Gogebic Iron Range has been rather unsatisfactory, on account of the stagnation in the iron market. There has been, however, continuous work in exploiting and developing all along the range, and several new finds have been made which will be listed among the shippers in 1892. In Michigan, deep drill holes at the Norrie & Ashland mine show an

abundance of ore at 1,500 ft. vertical depth, and at the Aurora the drill showed the continuation of the wonderful Norrie lens under this property. Extensive development is in progress at the Colby and Palma, with prospects of a large production should the market warrant it. The Anvil is in better shape than ever before, and prospects for the Eureka are bright. At the Mikado a 14-ft. vein of very good ore has been opened up, and the Sparta and Alpha, just west of the Brotherton, are mining steadily. These three mines will be added to the shipping list in 1892, or as soon as railroad facilities can be afforded them. The Wisconsin end of the range has hardly kept pace with the eastern in point of development except in few instances. Some new discoveries on the west side of the Iron Belt mine are showing up well, and the prospect is fair of this mine becoming the largest producer in this end of the Range. Exploration is in progress on a large proportion of the properties along the range from Pence to the Tylers Fork, but none as yet show merchantable ore in paying quantity.—*Eng. and Min. Journal.*

#### Texas and Its Railroads.

Chairman Reagan of the Texas Railroad Commission has written a letter in reply to one asking a statement denying the alleged unfriendliness of the Commission to railroads in order to reassure Eastern investors who manifest some doubt on that head. Judge Reagan says that he knows of no prejudice among the people of Texas against railroads. On the contrary, they have shown their friendliness by large donations of land and money. The Commission, so far from having any hostility to the roads, recognizes their great value to the State and means to do whatever it can, in justice to other interests, to promote their welfare. The depression in business of all kinds, due to scarcity of money and low prices, is attributed by certain newspapers to the Commission and its regulation of railroads. Such statements are notoriously false. Statements appeared recently in the New York *Financial Chronicle* showing the gross earnings of the roads of this state during this year to be greater than for a like period last year. There is as much railroad building going on now as there was a year ago. The Commission is having the same trouble passed through by commissioners in other states, but these things should not deter capitalists. Their money and property will be as safely protected here as in any state in the Union. "Capitalists will themselves know what allowances to make as to the false statements which have gone abroad about the action of the commission when informed that up to this time, while we have adopted some commodity tariffs, we have adopted no rate on general merchandise, and that as to the great body of commerce of Texas it is still carried on at rates prescribed by the officers of the roads and not by the commission."

#### LOCOMOTIVE BUILDING.

The Baldwin Locomotive Works have an order for a Vulcanian compound locomotive for the East Tennessee, Virginia & Georgia, and the Schenectady Works will probably build a similar engine, with two cylinders, to be used in a comparative test.

#### CAR BUILDING.

The Louisville & Nashville is reported as in the market for 1,000 freight cars.

The Ensign Car Works at Huntington, W. Va., are working on a contract for 600 cattle cars for the Canda Cattle Car Co.

It is understood that the Chicago & Alton will soon contract for new freight cars, the number being given as 1,000.

The Norfolk & Western has placed an order for 500 coal cars, to be built at once, with the Roanoke Machine Works. The cars are to be used on the Ohio and West Virginia extension.

The orders of the Cleveland, Cincinnati, Chicago & St. Louis, and of the Chesapeake & Ohio, already noted, are expected to be given out in a few days. The contracts, it is reported, will be for 2,000 cars for each road.

The Southern Street Car Co., with a capital stock of \$500,000, of which about \$350,000 is reported to have been subscribed, has been incorporated at Pensacola, Fla., by J. H. Carter, J. W. Dorr, and T. H. Curry.

The Florida Car Mfg. Co., of Green Cove Springs, Fla., with a capital stock of \$150,000, has been incorporated by Jas. G. Blaine and M. C. Blaine and Alba A. Silben. This company will establish car works for the manufacture of freight and passenger cars.

The Mt. Vernon Car & Mfg. Co. is now building 200 coal cars for the Evansville & Terre Haute, 200 coal cars for the Mobile & Ohio, 200 refrigerator cars for the Cleveland, Cincinnati, Chicago & St. Louis, 100 refrigerator cars for the Mobile & Ohio, and 200 refrigerator cars for the Union Refrigerator Transit Co. This company has recently built a 25 x 198 ft. annex to its wheel foundry.

Some handsome passenger cars have recently been built by the Pullman Co. for the Baltimore & Ohio "Southwestern limited," from designs furnished by Master Car Builder Grieves. Each train consists of a postal car and a baggage car, two passenger cars and two Pullman sleepers. The train is made up in Baltimore, but is properly an extension of the "Royal Blue line" service to and from New York. The entire train is vestibuled and the cars are built on the same model as the "Royal Blue" cars, which they resemble very closely inside.

#### BRIDGE BUILDING.

Cumberland, Md.—The George's Creek & Cumberland Railroad will build a new bridge over Wills Creek, near Cumberland, Md. The bridge will be of the plate girder type, three spans, each span 90 ft. and the girders 9 ft. deep. The bridge will take the place of an old wooden Howe truss bridge, and will be built for double track. The company has asked for bids for the superstructure and for rebuilding a part of the stone work.

The masonry for the Baltimore street bridge at Cumberland is finished and ready for the iron work, which will be erected as rapidly as possible. The Youngstown Bridge Co. has the contract for the superstructure, which will be of the plate girder pattern, plates 75 ft. long and 7 ft. deep.

Jackson, Tenn.—A contract has been awarded the Groton Bridge Co., of Groton, N. Y., for the construction of a bridge at Jacksboro, Tenn.

Litchfield, Ont.—The County Council of Litchfield, Ontario, is asking for tenders for the construction of a bridge across McLellan's Creek.

Pecos, Tex.—J. R. Gibson is inviting bids for the construction of an iron bridge over the Pecos River near Pecos. The bridge is to be 150 ft. long with a 12-ft. roadway.

Toronto Junction, Ont.—The Canadian Bridge Co. is erecting the steel span of the Weston road bridge, at Toronto Junction.

#### RAILROAD LAW—NOTES OF DECISIONS.

##### Powers, Liabilities and Regulation of Railroads.

The Supreme Court of Maine rules that the right of eminent domain is available by legislative grant to a railroad corporation which has constructed a railroad for the carriage of freight to and from certain linekilns, and goods to and from stores in a certain place, connecting with another railroad and running over a portion of its track under a contract between the two corporations, being eight miles in length, of standard gauge, operated by steam power, and costing nearly a half million dollars, obtained from the sales of stocks and bonds.

In Texas the Supreme Court holds that in an action to recover damages for the construction of a side track on a street on which plaintiff's lot abutted, the measure of plaintiff's damages is the difference in the market value of the land just before and just after the construction of such railroad, but plaintiff cannot recover for any depreciation resulting before the date of his purchase from the grant by the city of the right to build such track.

In Georgia it is held in the Supreme Court that in an action against a railroad company, which has wrongfully occupied a city street, brought by an abutting owner for damage to both his freehold and its rental value, the fact that the location of the railroad has increased the value of the freehold will not prevent the owner from recovering for the diminution in the rental value, since the railroad company, being a wrongdoer, cannot set off the one against the other.

In the Federal Court it is decided that where a railroad company whose property is covered by two mortgages buys on credit rails which are necessary for the purpose of keeping its road going, and the road is afterward placed in the hands of a receiver on application of the second mortgagee, the seller of rails has an equitable right, as against the second mortgagee, to have the earnings of the road in the hands of the receiver applied first to the payment of his claim; but he has no such right as against the first mortgagee, even though they have filed cross-bills in the suit, since they are not the ones who applied to the court of equity, and may therefore stand on their legal rights.

In the Supreme Court of Texas it is held that where a certain creditor is seeking judgment against a railroad company on certain bonds and mortgages, an intervening petition by the state, alleging that the bonds and mortgages are void, and that the railroad company, by collusion and neglect to defend, is about to allow judgment to go against it by default, that such railroad company, in consideration of large grants of land from the state, has agreed to maintain low rates of transportation; and that, if said bonds and mortgages are foreclosed, the rates will, of necessity, be increased, and impose great burdens on commerce,—does not show such a public interest as entitles the state to intervene and prevent such judgment; especially when neither the charter of the road nor any subsequent law reveals any such contract as that alleged, and the charter expressly provides that its rates of traffic shall be governed by state regulation.

##### Injuries to Passengers, Employees and Strangers.

A statute of Connecticut requires that the bell or whistle of a locomotive shall be sounded within 80 rods of a highway crossing, and shall be occasionally sounded until the crossing is passed. The Supreme Court holds that, though the statute is in the alternative, and the bell was continuously rung until the crossing was reached, the sounding of the whistle 400 ft. beyond the 80-rod point, and failure to sound it afterward, was negligence.

In Missouri it is ruled by the Supreme Court where persons have been accustomed for a long time to use a track as a tow path, and the company has never objected, such persons are not trespassers within the meaning of the law of 1889 forbidding persons to use tracks as highways.

<sup>1</sup> Farpaworth v. Lime Rock R. Co., 21 Atl. Rep. 373.

<sup>2</sup> Morrow v. St. L. A. & T. Ry. Co., 17 S. W. Rep. 44.

<sup>3</sup> Davis v. E. T. V. & G. Ry. Co., 13 S. E. Rep. 567.

<sup>4</sup> Bound v. South Carolina Ry. Co., (Cir. Ct.) 47 F. 30.

<sup>5</sup> State v. Farmers' Loan & Trust Co., 17 S. W. Rep. 60.

<sup>6</sup> Bates v. N. Y. & N. E. Ry. Co., 22 Atl. Rep. 538.

<sup>7</sup> Le May v. M. Pac. Ry. Co., 16 S. W. Rep. 1049.

#### MEETINGS AND ANNOUNCEMENTS.

##### Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Connecticut & Passumpsic Rivers, semi-annual, 2½ per cent. on the preferred stock, payable Feb. 1.

Great Northern, quarterly, 1½ per cent. on the preferred stock, payable Feb. 1.

Lake Erie & Western, quarterly, 1 per cent. on the preferred stock, payable Feb. 15.

Maine Central, semi-annual, 3 per cent., payable Feb. 15.

Mill Creek & Mine Hill Navigation & Railroad Co., semi-annual, 5 per cent., payable on demand.

Milwaukee, Lake Shore & Western, semi-annual, 3½ per cent. on the preferred stock, payable Feb. 15.

Mount Carbon & Port Carbon, semi-annual, 6 per cent., payable on demand.

Philadelphia, Wilmington & Baltimore, 4 per cent., payable Jan. 2.

Schuylkill Valley Navigation & Railroad Co., 2½ per cent., payable on demand.

##### Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Allegheny & Kinzua, annual, Olean, N. Y., Feb. 9.

Arkansas & Louisiana, annual, Washington, Ark., Jan. 25.

Brooklyn Elevated, annual, adjourned, 31 Sands street, Brooklyn, N. Y., Feb. 20.

Camden & Atlantic, annual, Cooper Point, Camden, N. J., Feb. 25.

Delaware, Lackawanna & Western, annual, 22 William street, New York City, Feb. 23.

Fort Wayne & Jackson, annual, Jackson, Mich., Jan. 25.

Huntington & Broad Top Mountain Railroad & Coal Co., annual, American Life Building, Philadelphia, Pa., Feb. 2.



Kansas City, Memphis & Birmingham, annual, Memphis, Tenn., Feb. 3.  
 Kansas City, Wyandotte & Northwestern, annual, Kansas City, Mo., Feb. 3.  
 Keokuk & Western, annual, Keokuk, Ia., Feb. 3.  
 Kingston & Pembroke, annual, Kingston, Ont., Feb. 3.  
 Mobile & Ohio, annual, 11 Pine street, New York City, Feb. 4.  
 Northern Central, annual, Baltimore, Md., Feb. 25.  
 Philadelphia & Erie, annual, Philadelphia, Pa., Feb. 8.  
 Pittsburgh & Lake Erie, annual, 77 Fourth avenue, Pittsburgh, Pa., Jan. 26.  
 Pittsburgh, McKeesport & Youghiogheny, annual, Pittsburgh, Pa., Jan. 26.  
 Scioto Valley & New England, annual, Columbus, O., Feb. 11.  
 Summit Branch, annual, 233 South Fourth street, Philadelphia, Pa., Feb. 9.  
 Wheeling & Lake Erie, annual, Toledo, O., Feb. 2.

#### Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:  
 The Railway Freight Claim Association of the Eastern, Western and Southern States will hold its regular semi-annual meeting at the Grand Pacific Hotel, Chicago, Ill., March 3.

The New England Railroad Club holds regular meetings at the United States Hotel, Beach street, Boston, Mass., on the second Monday of each alternate month, commencing January.

The Western Railway Club holds regular meetings on the third Tuesday in each month, except June, July and August, at the rooms of the Central Traffic Association in the Rookery Building, Chicago, at 2 p. m.

The Southern Railway Club holds regular meetings on the third Thursday of the months of January, February, March, May, September and November at such points as are selected at each meeting.

The Central Railway Club meets at the Hotel Iroquois, Buffalo, the fourth Wednesday of January, March, May, September and November.

The Northwest Railroad Club meets on the first Saturday of each month, except June, July and August, in the St. Paul Union Station, at 7:30 p. m.

The Northwestern Track and Bridge Association meets on the Friday following the second Wednesday of the directors' room of the St. Paul Union Station.

The American Society of Civil Engineers holds its regular meetings on the first and third Wednesday in each month at the House of the Society, 127 East Twenty-third street, New York.

The Boston Society of Civil Engineers holds its regular meetings at the American House, Boston, at 7:30 p. m., on the third Wednesday in each month.

The Western Society of Engineers holds its regular meetings at 78 La Salle street, Chicago, at 8 p. m., on the first Wednesday in each month.

The Engineers' Club of St. Louis holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesday in each month.

The Engineers' Club of Philadelphia holds regular meetings at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturday of each month. The annual meeting is held on the third Saturday in July, August and September.

The Engineers' Society of Western Pennsylvania holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Thaw Mansion, Fifth street, Pittsburgh, Pa.

The Engineers' Club of Cincinnati holds its regular meetings at 8 p. m., on the third Tuesday of each month in the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati.

The Civil Engineers' Club of Cleveland holds regular meetings on the second Tuesday of each month, at 8 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the fourth Tuesday of the month.

The Engineers' Club of Kansas City meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The Engineering Association of the South holds its monthly meetings on the second Thursday at 8 p. m. The Association headquarters are at Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The Denver Society of Civil Engineers and Architects holds regular meetings at 38 Jacobson Block, Denver, Col., on the second and fourth Tuesday of each month, at 8 o'clock p. m., except during June, July and August, when they are held on the second Tuesday only.

The Civil Engineers' Society of St. Paul meets at St. Paul, Minn., on the first Monday in each month.

The Montana Society of Civil Engineers meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The Civil Engineers' Association of Kansas holds regular meetings at Wichita on the second Wednesday of each month at 7:30 p. m.

The American Society of Swedish Engineers holds meetings at the club house, 250 Union street, Brooklyn, N. Y., and at 347 North Ninth street, Philadelphia, on the first Saturday of each month.

The Engineers' Club of Minneapolis meets the first Thursday of each month in the Public Library Building, Minneapolis, Minn.

The Canadian Society of Civil Engineers holds regular meetings at its rooms, 112 Mansfield street, Montreal, P. Que., every alternate Thursday except during the months of June, July, August and September.

The Association of Civil Engineers of Dallas meets at 803 Commerce street, Dallas, Tex., on the first Friday of each month at 4 o'clock p. m.

The Technical Society of the Pacific Coast holds regular meetings at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., at 8 o'clock p. m., on the first Friday of each month.

The Tacoma Society of Civil Engineers and Architects holds regular meetings on the third Friday of each month, in its rooms, 201 and 202 Washington Building, Tacoma, Wash.

Engineers' Club of St. Louis.

At the meeting of Dec. 2 the Secretary presented his annual report. The membership was 177. Eighteen meetings had been held and 20 papers read.

The committee on nominations for officers for 1902 presented the following names: For President, J. B. Johnson; for Vice-President, B. L. Crosby; for Secretary, Arthur Thacher; for Treasurer, Chas. W. Melcher; for Librarian, R. E. McMath; for Directors, George Burnet, B. H. Colby; for Board of Managers Association of Engineering Societies, J. B. Johnson, J. A. Laird.

For the next meeting, Dec. 16, an address by President Burnet and a paper on "The Action of the Reciprocating Parts of High Speed Engines," by Prof. A. T. Woods, were announced.

At the meeting of Jan. 6, Mr. Burnet opened the discussion on Roads and Road Laws, Messrs. McMath, Pitzman, Farham, Meier, Moore and Johnson following. There was no question as to the importance of the subject and the desirability of trying to improve the condition of affairs. The only point was as to the present of securing the best results and what laws could be passed. The following committee was appointed to consider the question and report to the club: George Bur, Julius Pitzman, R. E. McMath, Robert Moore, M. L. Holman.

Colonel Meier reported that the Eads Monument Commission had made good progress, and had been very successful in obtaining subscriptions in this country and Europe, and that they were now ready to push the work for local subscriptions.

For the next meeting, Jan. 20, the following paper was announced: "An Inclined Cable Railway for Transfer of Freight Cars between the Upper and Lower Yards of the Western Cable Railway Company," by Edward Flad.

New England Railroad Club.

A regular monthly meeting was held Wednesday evening, Jan. 13, 1892. President Twombly in the chair. A committee consisting of Charles W. Sherburne, Charles Richardson and Orlando Stewart was appointed to nominate officers for election at the March meeting of the club. The President announced as the subject for discussion at the March meeting "Freight Car Trucks," and the subject for the present occasion "Locomotive Boilers and their Attachments," to be opened by a paper by Mr. J. L. Speirs, to be followed by a paper by Mr. F. W. Dean. These are published on another page.

#### PERSONAL.

—Mr. J. Fairfield Carpenter has resigned the offices of Secretary and Director of the New York Air Brake Co.

—General W. J. Sewell, Vice-President of the West Jersey Railroad, has recently been elected Second Vice-President of the Baltimore & Potomac Railroad.

—Mr. R. Larmour, late Division Superintendent of the Grand Trunk, with headquarters at London, Ont., has been appointed General Agent of the Commercial Express Line.

—Car Accountant C. R. Fellows, of the Cleveland, Cincinnati, Chicago & St. Louis, has tendered his resignation, and will soon retire to accept the General Management of the Burton Stock Car Co.

—Mr. William F. Hallstead, General Manager of the Delaware, Lackawanna & Western, is now able to attend to part of his duties again, after a long and very serious illness, which at one time threatened to terminate fatally.

—Mr. D. M. Wheeler, who has been Chief Engineer of the Winona & Southwestern for about four years, since the construction of that line was begun, recently resigned that position and is now connected with the Northern Pacific.

—Col. Christian Febig, recently elected President of the Delaware Railroad, a Director of the Philadelphia, Wilmington & Baltimore Railroad, and President of the Farmers' Insurance Co., of Wilmington, Del., died at his home in that city on Friday. He was 74 years old.

—Mr. Henry C. Logan, General Eastern Freight Agent of the Missouri Pacific in New York, died at his home on Jan. 16. He had represented the Missouri Pacific in New York for the last four years, and had previously been agent for the Southern Pacific at New Orleans and El Paso, Tex.

—Mr. Isaac D. Barton, General Superintendent of the Long Island Railroad, has resigned, having been appointed General Manager of the New York & New England Railroad. Assistant Superintendent W. H. Blood has been appointed Acting General Superintendent of the Long Island.

—Mr. Thomas D. Messier, Third Vice-President of the Pennsylvania lines, was elected President of the St. Louis, Vandalia & Terre Haute at the recent annual meeting. He succeeds Mr. William R. McKeen, who was chosen Vice-President, and will continue to have charge of the operation of the line.

—Hon. John Haggert, Postmaster-General of the Dominion of Canada, has been appointed Minister of Railroads and Canals, to succeed the late Sir John A. Macdonald, Premier of Canada. Since the death of the Premier, Hon. Mackenzie Bowell, Minister of Customs, has been acting Minister of Railroads.

—Mr. Thomas J. Sullivan, of Palmyra, Superintendent of Bridge Construction for the Alden Bridge Co., of Rochester, died suddenly last week in the Adirondacks, for the Adirondack & St. Lawrence Railroad. He had charge of part of the work on the American portion of the cantilever bridge at Niagara Falls.

—Mr. George K. Lowell, Assistant Superintendent of the Louisville, New Albany & Chicago road, received internal injuries in the wreck on that road at Crawfordsville, Ind., and is found to be more seriously hurt than was at first supposed. Mr. Lowell has been Assistant Superintendent on this road for about eight months, and was previously Master of Transportation on the Louisville, Evansville & St. Louis and the Evansville & Terre Haute.

—Mr. Benazette Williams has been appointed Chief Engineer of the Chicago Drainage Board in the place of Mr. S. G. Artigstale, resigned. Mr. Williams is a graduate of the University of Michigan. His first work was of the city of Chicago as an assistant to the late E. S. practice. He, with Mr. Cooley, was on the Hiring Board which decided on the present plan.

—Mr. William Smith, Superintendent of Motive Power of the Boston & Maine, died suddenly in Boston last week. Mr. Smith was appointed Superintendent of Motive Power a few years ago, but he has been Master Mechanic since 1879. His entire railroad service, which began in 1849, when he was about 22 years old, was on the Boston & Maine. He was for nearly 23 years a locomotive engineer, and for six years an engine dispatcher, until appointed Master Mechanic in 1879.

—Mr. Joseph A. Linscott, Treasurer of the Maine Central since the death of Mr. John S. Cushing about eight years ago, has resigned that position on account of advanced age. Mr. Linscott is now in his eightieth year, and has been in the service of the Maine Central since 1871. He was Treasurer of the Androscoggin Railroad, and when that line was leased to the Maine Central he succeeded as Treasurer by Mr. George W. York, formerly Auditor.

—Mr. James Sedgely, a former Vice-President of the American Society of Master Mechanics, died at Washington, D. C., Jan. 13, at the age of 67 years. He was Master Mechanic of the Northern New Hampshire at Concord, N. H., for nearly 15 years. He resigned in 1885 to accept the position of General Master Mechanic of the Michigan Southern & Northern Indiana Railroad. In 1870, upon the consolidation of the Lake Shore & Michigan Southern, he was appointed Superintendent of Motive Power, remaining in this position until 1884, when, in consequence of impaired health, he retired from active business.

—Mr. W. F. Turrell, Assistant Superintendent of Motive Power of the New York, Lake Erie & Western, died in New York City this week of pneumonia, after a very short illness. Mr. Turrell had been connected with the Erie lines since the fall of 1880, first as Master Mechanic of the Chicago & Erie and later on the New York, Pennsylvania & Ohio. Mr. Turrell has been in charge of the motive power department of the system for some time on account of the long continued illness of Mr. Ross Kells. Mr. Turrell was born in Toronto, Ont., in 1834, and has been in railroad service since 1853. He was for various western railroads, and was General Foreman of the shops of the Cleveland & Pittsburgh at Cleveland between 1880 and 1874. In the latter year he was appointed Master Mechanic and Master Car Builder of the Cleveland, Tuscarawas Valley, Superior & the Indianapolis division of the Cleveland, Columbus, Cincinnati & Indianapolis, and consolidation of that road and the Cincinnati, Indianapolis, St. Louis & Chicago, he was Superintendent of Motive Power, but resigned a few months later, and became connected with the New York, Lake Erie & Western.

—One of the saddest accidents that the Railroad Gazette has had to record in a long time is the drowning of Mr. Dominick M. Carey, of the contracting firm of Paige, Carey & Co., of New York, in Wheeling Creek at Main street, mention of which has been made in this paper from time to time. Mr. Carey was born in Dundas, Ont., in 1844, but he had lived at Cleveland for many years. The first large contracting work of Mr. Carey was the construction of the Valley (Ohio) road into Cleveland, the firm now called the Cleveland & Canton. After this the firm of Paige, Carey & Co. was formed, Mr. Carey being the managing partner. The firm contracted for many of the most important railroad lines built in the Middle and Eastern States, and had a subcontract for five miles of the Croton Aqueduct for New York. The largest railroad work undertaken by the firm was the building of the Wheeling Bridge & Terminal Railroad system, a work costing nearly \$4,000,000. It included the masonry for the large bridge over the Ohio River, several tunnels, and seven miles of track in the city of Wheeling. The Commissioners of the bridge granite block to be engraved with a suitable legend and built in the bridge in his memory.

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**Chicago & Great Western.**—The incorporators and Board of Directors are John L. Pratt Seymour, Samuel C. Stickney, Henry A. Gardner, William A. Gardner, and Park E. Simmons, Chicago; Robert C. Wright, Charles Nichols, Raymond Dupuy and Emmerson Hadley, St. Paul.

Officers were elected at a meeting on Jan. 12. They are Samuel C. Stickney, Chairman; Raymond Du Puy, President; Charles Nichols, Vice-President, and Robert C. Wright, Secretary and Treasurer.

**Chicago, Rock Island & Pacific.**—At a special meeting of the board of directors held Jan. 11, George T. Boggs, late Paymaster, was appointed Assistant Treasurer and Assistant Secretary in New York City, vice James R. Cowing, resigned. William A. Purdy has been appointed Paymaster of the lines of the system east of the Missouri River, vice George T. Boggs, promoted.

**Choctaw Coal & Railway Co.**—The annual election of the company was held in Minneapolis last week. The following directors were chosen: Charles Hartshorne, John B. Garrett, Samuel G. De Coursey, Jacob A. Wolterton, William C. Alderson, George B. Kirkbride, John C. Sims, Frank H. Rogers and Alan H. Reed.

**Cleveland, Cincinnati, Chicago & St. Louis.**—Frank Ferris has been appointed General Agent of the freight department at Cincinnati to succeed R. P. Buchanan, recently appointed Assistant General Freight Agent at Cincinnati.

**Cleveland & Marietta.**—At the annual meeting of the company at Cleveland, O., Jan. 18, the former Board of Directors was re-elected, and Gen. A. T. Wikoff was again chosen President.

**Cleveland & Pittsburgh.**—The following directors were re-elected at the annual meeting in Cleveland Jan. 7: Charles Lanier and W. C. Eggleston, New York; George B. Roberts, Philadelphia; Henry Darlington, Pittsburgh; E. A. Ferguson, Cincinnati, and J. V. Paynter, E. R. Perkins, H. F. Smith and M. A. Hanna, Cleveland, O. The vacancies caused by the death of B. F. Jones, M. W. Holloway and Judge R. P. Ranney were filled by the election of J. S. Kennedy, New York; J. T. Brooks, Salem, and H. C. Ranney, Cleveland.

**Columbus, Hocking Valley & Toledo.**—The office of M. S. Connors, Superintendent of the Hocking River Division, will be removed from Logan to Columbus, O.

**Dayton & Union.**—At the annual meeting of the stockholders at Dayton, O., Jan. 12, these directors were elected: M. D. Woodruff, E. Zimmerman, Cincinnati; H. F. Shoemaker, G. D. Layne, New York; R. E. Marshall, Dayton; G. S. Russell, H. H. Peppleton, Cleveland, and J. Ramsey, Jr., Cincinnati. The Board elected H. F. Shoemaker, President; J. Ramsey, Jr., Vice-President and General Manager; W. F. Stark, Superintendent.

**Fonda, Johnstown & Gloversville.**—The annual meeting of this company was held Jan. 12 at Gloversville, N. Y., when the following directors were re-elected: W. J. Heacock, John McNab; D. A. Wells, L. Veghte, Wm. Littauer, C. W. Judson, A. D. Baker, L. Caten, M. Wade, H. Veghte, D. B. Judson, G. F. Mills, W. A. Heacock.

**International Railroad Congress.**—M. Belpaire, General Manager of the Belgian State Railroads, has been chosen President of the Executive Committee of this Congress in place of Albert Fassiaux.

**Kansas City, Fort Scott & Memphis.**—J. J. Fletcher, formerly Assistant General Freight Agent of the Cleveland, Cincinnati, Chicago & St. Louis, is now General Freight Agent of this road. He has appointed C. W. Cheers, Commercial Agent at Columbus, Ga., to be Assistant General Freight Agent, with headquarters at Memphis.

**Lake Shore & Michigan Southern.**—J. R. Reniff has been appointed Master Car Builder of the Toledo division of the Lake Shore, with headquarters at Toledo, vice B. F. Humberger, resigned.

C. S. Padgett, who has been a conductor on the Wagner dining cars on the Lake Shore, has been appointed Superintendent of the dining car service on that road and will take charge Feb. 1, when the company assumes control of the Wagner cars on its line.

**Lehigh Valley.**—At the annual meeting in Philadelphia last week the following directors were re-elected: Elisha Wilbur, Charles Hartshorne, William L. Conyngham, Ario Pardee, William A. Ingham, Robert H. Sayre, James I. Blakeslee, John R. Fell, Robert A. Lamberton, John B. Garrett, Charles O. Skeer, Calvin Pardee, Geo. C. Thomas. The following officers were elected: Elisha Wilbur, President; Charles Hartshorne, Vice-President; Robert H. Sayre, Second Vice-President; John B. Garrett, Third Vice-President; William C. Alderson, Treasurer; John R. Faasshaw, Secretary.

**London & Port Stanley.**—A meeting of the shareholders was held at London, Ont., last week, and directors were chosen as follows: L. J. Seargent, C. Stiff, J. Hobson, J. Egan, G. Birrell, W. F. Reid, J. McClary, R. Pritchard, T. S. Hobbs, Mayor Spencer, and Mayor McCully, of St. Thomas. Mr. J. Egan was re-elected President, and Mayor McCully Vice President.

**Louisville, St. Louis & Texas.**—Lawrence Parkson, formerly General Freight Agent of the Louisville, Evansville & St. Louis, has been appointed Traffic Manager of this road and H. C. Mordue has been appointed General Freight Agent.

**Maine Central.**—George W. York has been appointed Treasurer, with office at Portland, Me., and has been succeeded as Auditor by William W. Colby.

**Marquette & Western.**—The following officers have been elected: Jesse Spalding, Chicago, President; A. C. Merryman, Marquette, Wis., Vice-President; J. A. Van Cleve, Marquette, Treasurer, and G. W. Hanley, Marquette, Secretary; directors, the officers and Isaac Stephenson, Fred K. Carney, H. C. Higgins, Caleb Williams and Warren J. Davis.

**Marion & Rye Valley.**—The following are the incorporators of the company, recently chartered in Virginia: Charles T. Darling, Earle C. Bacon and J. V. A. Craighead, of New York; and John S. Apperson, John P. Sheffy, W. C. Pendleton, G. D. H. Killinger, Joseph Atkins and Geo. W. Richardson, of Smythe County, Virginia.

**Mexican Central.**—James A. Snell, who has been Acting Material Agent for some time, has been appointed General Material Agent.

**Mexican Southern.**—W. A. Eckersley, General Manager of lines under construction, has removed his headquarters to Tierra Blanca, Oaxaca, W. Morcom assuming

the duties of Manager of the operated line with headquarters at Puebla.

**Milwaukee, Lake Shore & Western.**—E. M. Sprague has been appointed Superintendent of Bridges and Buildings with headquarters at Milwaukee.

**Minneapolis Terminal.**—O. O. Winter, recently General Superintendent of the Fort Worth & Denver City road, is now Superintendent of this road, with headquarters at Minneapolis.

**Missouri, East Tennessee & Virginia.**—The following are the officers of the company: Hon. George M. Buttrick, of Everett, Mass., President; Hon. George Odiorne, of Boston, first Vice-President; Franklin Rolfe, of Winchester, second Vice-President; Mr. L. C. Wolkins, of Boston, Secretary; George H. Drew, of Boston, Treasurer, and George M. Stearns, of Boston, Counsel.

**Mobile & Ohio.**—D. O. Smith, who was formerly foreman of the Louisville & Nashville shops at Birmingham, Ala., has been recently appointed Master Mechanic of this road, with headquarters at Whistler, Ala.

**Monongahela Southern.**—At the recent annual meeting in Pittsburgh officers and directors were chosen as follows: President, Henry A. Laughlin; Vice President and Treasurer, J. Laughlin, Jr.; General Manager, W. C. Quincy; Secretary and Auditor, Benjamin Page; Directors, B. F. Jones, G. H. Laughlin, W. L. Jones, J. Laughlin, Jr., W. L. King and B. F. Jones, Jr.

**Montgomery Belt Line.**—A meeting of the directors was held Jan. 18, at which the following officers were elected: A. A. Wiley, President; M. F. Plant, Vice-President, and J. Moultrie Lee, Secretary and Treasurer.

**Newcastle & Beaver Valley.**—The annual meeting of the stockholders of the company was held at Newcastle, Pa., last week. The following officers were elected: President, S. W. Cunningham, Pittsburgh; Directors, Wm. Patterson, John B. Jackson, John L. Crawford, Leander Raney, A. R. Lee, and J. M. Capp.

**New Orleans Pacific.**—This road, which is the Louisiana division of the Texas Pacific, elected the following directors last week: Jay Gould, R. S. Hayes, George J. Gould, John A. Grant, Russell Sage, W. B. Schmidt, Pearl Wight, Sam Boyd, J. C. Denis, S. S. Prentiss, A. Schrieber, Alfred Moulton, Adolph Meyer, E. B. Wheelock, Robert Strong. Colonel E. B. Wheelock was re-elected President and Major Robert Strong Secretary and Treasurer.

**New York, Lake Erie & Western.**—G. H. Macdonough has been appointed Engineer of Signals for the New York, Pennsylvania & Ohio Railroad Divisions, with office at Cleveland. The Engineer of Signals will have general charge of the maintenance and erection of all fixed signals on the above divisions, reporting to the General Superintendent.

**Norfolk, Wilmington & Charleston.**—R. E. B. Stewart, H. W. West, H. I. Smith Dougherty, Thomas Pinckney, Thomas L. Huguenin, John C. Maloney, S. S. Welkins, R. G. Dobson, Jno. T. West, James S. Mitchell, Carroll Forster and others are the incorporators mentioned in the bill introduced in the Virginia Legislature.

**North & South Idaho.**—The directors of the company at meeting at Nampa, Idaho, elected J. F. Curtis, President; J. R. DeLamar, Vice-President; J. S. McGee, Secretary; W. H. Ridenbaugh, Treasurer, and Governor Wiley, Montie B. Gwinn, Howard Sehree and Alfred Cobb, Directors.

**Norwich & Worcester.**—The old directors have been re-elected and Charles P. Cogswell, of Norwich, Conn., in place of J. Halsey of the same city, who declined reelection.

**Pennsylvania.**—Oscar A. Knipe has been appointed Assistant Auditor of Disbursements. He is at present Assistant Auditor of the Empire Line. He will enter upon his new duties on Feb. 1.

**Pittsburgh, Cannonsburg & State Line.**—A. Succop, of Pittsburgh, has been elected President of this projected line, to succeed the late Charles Meyram.

**Pittsburgh, Chartiers & Youghiogheny.**—At the annual meeting of this company in Pittsburgh last week, a board of officials in the interest of the Pennsylvania was elected as follows: President, James McCrea, instead of E. Schwartz; Secretary, R. T. Hill; Treasurer, T. H. McKnight; Directors, J. T. Brooks, J. E. Davidson, J. J. Brooks, E. B. Taylor, J. W. Renner and J. J. Turner, all of Pittsburgh.

**Powellton & Pochontas.**—The company held an annual meeting at the office of G. S. Couch, at Charleston, W. Va., last week, and elected the following directors: Evan Powell, N. Johnson, B. S. Evans and E. W. Knight.

**Richmond & Danville.**—The recently elected directors have re-elected the following officers: Second Vice-President, A. B. Andrews, Raleigh, N. C.; Third Vice-President, John A. Rutherford, New York; General Manager, W. H. Green, Atlanta; Traffic Manager, Solomon Haas, Atlanta.

**Richmond, Gayton & Southside.**—The incorporators of this company are: Ware B. Gay, H. W. Cunningham, J. H. Freeland, A. R. Winslow, of Boston; H. C. Skinner, E. B. Arnold, of New York; Julius Baker, M. M. Gilliam, H. Lee Lorraine, Edward H. Gay, W. W. Palmer, of Richmond, and John T. Jones, of Gayton, Va.

**Rio Grande Southern.**—S. K. Hooper, General Passenger Agent of the Denver & Rio Grande, has been appointed General Passenger and Ticket Agent of this road, with office in Denver, Colo., in addition to his duties on the former line.

**Rio Grande Western.**—Joseph Brinker, formerly City Passenger Agent at Salt Lake City, has been appointed Assistant General Freight Agent of this road. He succeeds William Brown, who recently resigned.

The title of W. E. Welby, Superintendent, has been changed to General Superintendent. When W. H. Bancroft resigned last fall the office of General Superintendent was abolished, the title of Mr. Welby, who succeeded him, being made Superintendent.

**St. Louis Transfer.**—A. De Figueiredo has been appointed General Freight Agent. He has been Superintendent of the St. Louis Cable & Western.

**Sharpsville.**—The annual meeting of this road, which is owned jointly by the Baltimore & Ohio and Pennsylvania, was held in Pittsburgh recently, and the following officers were elected: President, J. V. Patton; Vice-President and Treasurer, J. B. Washington; Secretary, W. L. Washington, all of Pittsburgh; Directors, C.

K. Lord, Baltimore; T. D. Messler, Johns McCleave and E. B. Taylor, Pittsburgh; J. J. Pierce, Sharpsville, Pa., and J. B. Caven, Cleveland, O.

**Sonora.**—John J. Kendall has been appointed General Agent, with headquarters at Mazatan, Mex.

**Wallerboro, Summerville & Otranto.**—The following are the directors of this company, recently incorporated in South Carolina: H. St. J. Card, Robert A. Pringle, S. W. Simons, S. Lewis Simons and W. Gibbs Whaley.

**Western New York & Pennsylvania.**—A meeting of the newly elected directors of the company was held this week and Samuel De Coursey was elected President, T. S. Buell Treasurer, and J. R. Trumbell, Secretary.

**Wheeling & Elm Grove.**—The annual meeting of the stockholders of the company, held on Monday last, elected as directors: Anton Reymann, J. D. Dubois, H. Bierherson, F. Happy, August Rolf, George Jeffers and Hermann Grimm.

**Wheeling, Pittsburgh & Baltimore.**—At the annual meeting at Pittsburgh the following officers were elected: President, J. B. Washington, Pittsburgh; Secretary, A. W. Black, Pittsburgh; Treasurer, W. H. Ijames, Baltimore; Directors, C. F. Mayer, Baltimore; James McCleave, John D. Scully, J. B. Washington, A. M. Byers, Pittsburgh, and W. W. Smith and William Workman, Washington, Pa.

**Withlacoochee & Gulf.**—The following first board of directors have been elected: J. M. Baker, Floral City, Fla.; Charles G. Wilson, Ball Hill, Fla., and J. C. Priest, Mansfield, Fla.

**Youghiogheny Southern.**—The annual meeting was held at Pittsburgh last week. The officers chosen are: President, H. C. Frick; Secretary and Treasurer, G. B. Bosworth; Directors, H. C. Frick, Philip Keller, Jr., John Pontefract, G. B. Bosworth, M. M. Bosworth, W. C. McCausland and W. F. McCook.

## RAILROAD CONSTRUCTION.

### Incorporations, Surveys, Etc.

**Alabama Midland.**—George Peterson is reported to have secured contract for grading the first 60 miles of the extension south from Luverne, Ala.

**Alabama Roads.**—The State Commissioner has completed the survey of the route for a railroad from Florence to Mobile, Ala., and is now preparing the profile. The distance is 341 miles, and the construction will, it is said, be easy. John A. Milner, of Birmingham, is Chief Engineer. The purpose of the survey made for the state was to obtain data of the cost of constructing such a line, with the purpose, if possible, of inducing some company to build the line.

**Bangor & Aroostock.**—Very satisfactory work is now being done on this Maine railroad, and the engineering parties have been completing the surveys rapidly within the past two or three weeks. Preliminary surveys are completed upon the Ashland and Fort Fairfield branches. Both branches will be finally located and surveyed not later than next week.

**Bayfield Harbor & Great Western.**—President W. F. Dalrymple is in the East to secure capital for building this road. The engineers, who are still in the woods, report grades below the normal. The Bayfield Transfer Railroad has been organized for the purpose of building tracks along six miles of the harbor frontage, and will be controlled by the incorporators of the Bayfield Harbor & Great Western.

**Bridgeport & Decatur.**—The grading will be resumed this month on this short Texas line if the arrangements now proposed are carried out. The contract for completing the 14 miles to Bridgeport, Tex., will be let this month. The line has been partly graded for some miles beyond Decatur. It is to connect with the Fort Worth & Denver City road at that point and extend westerly to coal fields in Wise County near Bridgeport. A. D. Locke, of Decatur, is Secretary of the company.

**Butters Lumber Co.**—Four miles of the narrow gauge railroad of the Butters Lumber Co., at Hub, Columbus County, N. C., have been graded and the trestling will soon be completed. The rails and locomotives have been shipped and will be delivered in a few days.

**Chicago & Great Western.**—Articles of incorporation were filed by this company in Illinois last week. Many of the incorporators are officers of the Chicago, St. Paul & Kansas City road. The road which it is proposed to construct is to extend from a point on the state line between Indiana and Illinois to a connection with the Chicago, St. Paul & Kansas City on Lake Michigan, near Chicago. There is to be a branch from this line to a point near the mouth of the Calumet River, in Cook County.

**Christiansburg Belt Line.**—The contract has been let to Rogers & O'Brien, of Roanoke, Va., for constructing three miles of this road at Christiansburg, Va., connecting near the town with the Norfolk & Western.

**Fordville, Hartford & Southwestern.**—Subsidies of about \$191,000 have recently been voted to this company at Fordville, Ky. The construction of the line, however, will probably be postponed until the validity of these and other bonuses have been decided by the court. This may postpone the beginning of work for more than a year. The line is to extend from Fordville, the terminus of the Louisville, Hardensburg & Western south via Hartford to a point on the Chesapeake, Ohio & Southwestern, a distance of 24 miles. Thos. J. Smith is President, and J. J. McKenley, of Hartford, is Secretary and Treasurer.

**Hearne & Brazos Valley.**—The construction work on this Texas road is still entirely suspended, and it has been for some months. The road has been built from Hearne west to Mumford, a distance of 14 miles, but it was expected to continue work on the line and build it to a point further along the Brazos River. The officers have abandoned all idea of any immediate construction and there is no prospect, now, however, of the work being resumed until next summer. The grading may be commenced in June next on the extension from Mumford to Moseleys Ferry on the Brazos River.

**Kingston, Smith Falls & Ottawa.**—The Grand Trunk Railroad is said to have secured the control of the charter of this road and to purpose to begin the construction of the road early in the spring. It is to extend from a point on the Grand Trunk near Ballentine, a station east of Kingston, Ont., northerly toward Smith's Falls, Ont., a distance of about 45 miles.

**Laconia & Hamden.**—A press dispatch announces that an issue of nearly \$3,000,000 of the bonds of this



company have been sold to an eastern syndicate and that this insures the completion of the road next summer or fall between Hadley Junction on the Toledo & Ohio Central near Lancaster south to Hamden and Wellston, O. The bonds bear six per cent. interest and are issued at the rate of \$20,000 per mile.

**Lancaster, Oxford & Southern.**—This road will probably be put under contract very soon. The line is all located, the plans are perfected, and the greater part of the right of way is secured. The line, when completed, will extend from Quarryville, Lancaster County, via Oxford, Chester County, to a connection with Baltimore & Ohio Railroad, either at Singler or Childs Station, in Cecil County, Md., 32 miles. S. C. Slaymaker, of Lancaster, Pa., is Chief Engineer.

**Marquette & Western.**—This company has been organized by the Business Men's Association of Marquette, Wis., and as before noted, is to build a railroad from Marquette west to Abbotsford, 140 miles, where it will connect with the Wisconsin Central. An exploration of the country between Marquette and Abbotsford is now being made by J. H. Raymond, who reports that the route is a very feasible one, comparatively level and easy to build. What towns the roads will pass through is not yet determined and will not be until Mr. Raymond makes his report, when arrangements will be made to have a full survey made. Marquette is located at the mouth of the Menominee River on Green Bay, and has a very fine harbor. At present there is no western outlet, which this road is intended to fill. It will complete a route from St. Paul extending directly to Green Bay Harbor.

**Mexican International.**—Tracklaying on the line from Torreon to Durango commenced on Jan. 1, and it is expected that the road will be completed to Pedro Seta by March 1.

**Mexican National Construction Co.**—General Palmer and other officers have recently returned from a long inspection trip over the proposed line from Manzanillo to Guadalajara, Mex. The line is constructed from Manzanillo to Colima, a distance of 98 kilometres. The construction of the remainder will present some difficulties on account of the many deep barrancas on the route. The company is filling a trestle across the Laguna de Cuyutlan at Manzanillo. The trestle is 1,480 metres long and will require about 85,000 cubic metres of embankment.

**Middle & East Tennessee Central.**—Trains have recently been run over the 12 miles of road between the connection with the Chesapeake & Nashville, eight miles north of Gallatin, Tenn., near Rojana, and Hartsville. The construction work at the latter point has only recently been completed by J. C. Rodemer & Co., of Gallatin, who will also build the extension southeast to the Cumberland River and to Carthage to connect with the Nashville & Knoxville. It has not been decided when work will begin on this extension. The road is now being operated by J. C. Rodemer & Co. as lessees. Preferred stock has been issued by the company to the amount of \$144,000 and first mortgage bonds at the rate of \$12,000 a mile.

**Missouri, East Tennessee & Virginia.**—Three parties of engineers are at present engaged in the survey west of Knoxville. About two-thirds of the route has been surveyed so far. A contract for building about 60 miles of the line from Knoxville west to Rockwood has been let to John F. Watkins Sons & Co., of Baltimore, Md. The projected route is from Bristol southward through Kingsport, Greenville, Newport and Sevier to Knoxville. West of that town the line is projected through Kingston, Rockwood, Crossville and Sparta and Smithville to Nashville. The company is said to be negotiating for the purchase of the Tennessee Midland, proposing to complete it from the Tennessee River to Nashville, and for the Overland dummy line, which has about six miles of road built at Nashville. The various companies included in the system of the Missouri, East Tennessee & Virginia Railroad were organized last year, and in 1890. The Lehigh Valley & Southern Coal, Iron & Railroad Co., was formed at Greenville, Tenn., in August, 1891, and the Southern Coal, Iron & Railroad Co. in January, 1890. The officers state that \$4,500,000 of the capital stock has been subscribed, and that \$420,000 of this amount has been paid into the treasury. The officers of the company are mostly New England men, the President being George M. Buttrick, of Everett, Mass., John F. Watkins Sons & Co., of 10 North Charles street, Baltimore, are the Chief Engineers.

**Montana Central.**—It is probable that the Nebraska branch will be extended from its present terminus to Castle, Mont. The distance would be 37 miles and the extension would reach valuable mines in the Belt Mountains.

**New Fonda.**—Caroline County, Md., will petition the Maryland legislature for authority to issue \$60,000 of bonds to aid in the construction of the railroad from Greensborough via Denton to Fonda. The distance is about 20 miles.

**Nicola Valley.**—This company is applying for a charter from the Dominion Government and for power to extend the line from Nicola Lake by way of Douglas Lake, Grande Prairie, Vernon, Coldwater Valley, Cherry Creek Mines and Fire Valley, to Arrow Lake, thence along Arrow Lake to connect with the Columbia & Kootenay Railway at Robson.

**Oxford Mountain.**—The contract for constructing the extension of this road north of Lawrenceville, Que., will probably be let in March. The road is now completed from Eastman near the southern boundary line of Quebec to Lawrenceville and the extension proposed is to extend north from that town to Finglesy and will be about 30 miles long. The company has arranged for the money to complete the line as projected. No bonds have yet been issued but they may be authorized when the extension is put under contract, but this part of the matter is still undecided. No rolling stock has yet been purchased, that for use on the completed section having been rented. The office of the company is at Montreal.

**Philadelphia & Reading.**—The officers of the company deny that the surveys reported in progress from Pleasantville north to Ordmanic, N. J., are being made by the engineers of that company.

**Pittsburgh, Canonsburg & State Line.**—President A. E. Succop, of this company, has agents at work to secure the balance of the right of way, while the engineers are preparing plans. Mr. Succop has said that he expected to have the line under contract some time this spring. The part of the road to be built first is between Pittsburgh, Pa., and Wellsburg, W. Va., between which points the permanent location has been established, and nearly all the right of way secured. The road follows

Buffalo Creek from Wellsburg to its headquarters, thence across to Canonsburg; from there down the right side of Charters Creek to Van Eman's Station, thence by way of McMurray, Liberty and Castle Shannon, entering Pittsburgh at the South Side through a tunnel. Some work has already been done on the line, work having been commenced on Oct. 15 in Charters township, Washington Co., Pa.

**Pittsburgh, Ohio Valley & Cincinnati.**—The track has now been laid on this line from Bellaire, O., south along the Ohio River to within two miles of Powhatan. The grading has been completed to the latter point, about 15 miles from Bellaire, and this will be the terminus of the new road for some time. The company has a charter to continue its road along the Ohio River to Marietta, a distance of 76 miles, and some surveys have been made for most of this distance. It is not likely, however, that construction work will be continued along the Ohio Valley more than a few miles beyond Powhatan, but the road may be built westerly across Ohio from a point near that town toward Coshocton to connect with the Toledo, Walhonding Valley & Ohio. This line is also controlled by the Pennsylvania, and is now under construction.

**Pontiac Pacific Junction.**—This company is applying for an extension of time to build the bridge over the Ottawa River at Ottawa, for the completion of the line in Pembroke, Ont., and further to extend the time for the payment of the subsidies voted by the Dominion Government.

**Potts Creek Mining & Manufacturing Co.**—This company has engineers at work surveying a route for a short line across its property in Alleghany County, Va., to the line of the Chesapeake & Ohio Railroad. At a meeting of the stockholders held last week it was decided to begin the construction of the road as soon as the weather would permit.

**Puget Sound & Pacific Ocean.**—The Mason County Company has been absorbed by this company, recently organized in Washington by E. P. Ferry, of Park City, Utah, and others. The line will be extended through Mason County to Gray's Harbor and to a connection with the new Gray's Harbor branch of the Northern Pacific.

**Reading, Lancaster & Baltimore.**—The engineers will probably begin the surveys for this road very soon. The line is to extend from Reading, in a southerly direction via Adamstown and New Holland, crossing the Pennsylvania near Seaman Place, Strasburg and New Providence, all in Lancaster County, and to the head of Chesapeake Bay either at Perryville or Charlestown, a distance of 70 miles. A branch will be built from Strasburg to Lancaster, eight miles. H. C. Lehman, of Lancaster, Pa., is President and S. C. Slaymaker is Chief Engineer.

**Richmond, Gayton & South Side.**—A bill has been introduced in the Virginia legislature to incorporate this company to build a railroad from Richmond or Manchester, easterly along the James River to a point near Warwick, on the James River, passing through Henrico, Chesterfield, Powhatan, Goochland, and other counties.

**Sandusky & Columbus Short Line.**—The contract for the extension of the line to Columbus, O., will probably be let within the next six weeks. The surveys have been completed to the connection, near Columbus, with the Columbus, Shawnee & Hocking road, which practically controls the new line. The survey has been made through Bellevue, which is at present the end of track, and through Bloomville, Bucyrus, Marion, and Delaware to the Southern terminus. The length of the line will be about 110 miles. The engineer will have the profile for the southern end of the route completed in a few weeks, and the company will then begin to secure the right of way. This, it is expected, can be obtained in less than two months, and the company will then be ready to begin the construction work early in the spring. The work will not be very difficult, the maximum grade being about 4½ ft., and the maximum curves four degrees. P. J. Aid, of Columbus, O., is Chief Engineer.

**Skowhegan & Norridgewock.**—Bids will be received until Feb. 1 from contractors for constructing the line along the banks of the Kennebec River from Skowhegan west to Norridgewock, connecting the Maine Central and Somerset roads. The contract will be for 5½ miles of road of comparatively easy construction and will include 100,632 cu. yds. of earthwork, 1,000 cu. yds. of loose rock, 865 cu. yds. of bridge masonry and 3,200 yds. of rip-rap, besides culverts and other material. There will be two iron girders, 20 ft. long.

**Snohomish, Skykomish & Spokane.**—Engineer H. S. Huson, of King, Dickinson and Huson, contractors, has made an examination, and will report upon the route for the proposed four-mile Port Gardner Bay extension of this road, which is projected by those interested in the Everett, Wash., townsite. The road, when extended, would be 15 miles in length.

**Texas & Bismarck.**—Articles of incorporation have been filed with the Secretary of State of North Dakota by this company. The charter is for a line to extend from Galveston, Tex., through Topeka, Kan., to Bismarck.

**Tuscaloosa Northern.**—This company has been organized to build a road from the Warrior River, near Tuscaloosa, Ala., to the Maxwell coal mines. The new line will be 17 miles long, and will be distinct from the Memphis & Atlantic, under which it was reported Jan. 8. A construction company is being formed by F. M. Abbott, of West Point, Miss., President of the Memphis & Atlantic, and others interested in the project, and when the organization of this company has been completed the construction of the new road will probably be commenced.

**Valley (Montana).**—It is expected that the construction of this road near Helena, Mont., will be resumed in a few weeks. New contracts for grading and tracklaying will be let in March. Several miles of the road have been graded near Helena, but the work was stopped in the fall when only two miles of track had been laid. The road is projected to extend northeasterly from Helena to the Sapphire mining fields on the Missouri River, and thence easterly along that river to Canon Ferry. The line has been surveyed, and the construction will probably be completed during the summer and fall on about 20 miles of the road. The maximum grade is 115 ft. to the mile, and the maximum curve is eight degrees. One trestle several hundred feet long will be built, but no iron bridges, it is thought, will be necessary. Richard A. Harlow, of Helena, is President, and W. A. Haven is Chief Engineer.

**Virginia Iron & Railway Co.**—Proprietors of the Rockbridge Alum Springs Co., of Virginia, have sued

the company for failure to run its cars from Goshen to the Springs, as contracted.

**Virginia Roads.**—In addition to those railroad bills already noted under this title the following have been reported in the Virginia Legislature or have become laws at the present session. The acts for incorporating companies have been for the Salem, Craig Railway & Mining Co.; the Norton Railroad, to build a line in Wise County; the Norfolk, Wilmington & Charleston; the Atlantic, Staunton & West Virginia; the Empire Transportation Co. and the Rapid Transit & Improvement Co., of Norfolk. Acts have been passed to authorize the Chesapeake & Ohio to issue additional bonds, and to authorize the company to construct or acquire branches or extensions to its main line; extending the time for completing the Washington & Western and the Dickinson County roads; authorizing the Seaboard & Roanoke to construct a second track through the city of Portsmouth; to confirm the consolidation of the Norfolk & Virginia Beach and the Danville & Seaboard under the name of the Norfolk, Albemarle & Atlantic, which was effected in March, 1891; amending the act of incorporation of the Roanoke, Fincastle & Clifton Forge and of the Midlothian, Manchester & Richmond, the Georgetown & Falls Church and the Norfolk Belt Line, and to authorize the Alleghany Iron Co. to construct a railroad.

**Waynesburg & Washington.**—President Jackson, who has had in contemplation the extension of a narrow gauge line from Mannington, W. Va., to Clarksburg, W. Va., last week received a proposition from the Pennsylvania company offering to build the line provided free right of way is given for the entire route. This proposition will be accepted, and agents have been employed to solicit right of way. Work will be begun as soon as the winter ends if the right of way can be secured.

**Wilmington & Weldon.**—The grading on the extension of the Florence branch from Latta, S. C., will probably be completed early in February and it is proposed to have the tracklaying completed during that month so that the line will be ready for operation by March 1. The Florence Railroad is that portion of the Wilson & Fayetteville branch lying in South Carolina and the road now being built extends northwesterly from near Latta, 11 miles north of Pee Dee to Clio, a distance of about 18 miles, the terminus being a few miles south of Bennettsville. The new branch has been built principally for use as a lumber line.

**Winnona & Southwestern.**—It is reported that this road is about to purchase the Mason City & Ft. Dodge and that the proposed extension to Omaha will be built by way of Jefferson, Coon Rapids and Audubon. The officials of the company say the line will certainly be extended this season from Ossage to Mason City.

**Wisconsin Central.**—The right of way has been secured for a cut-off which will extend from Marshfield to Bateman, Wis.

#### GENERAL RAILROAD NEWS.

**Augusta, Gibson & Sandersville.**—A receiver was appointed last week at Augusta, Ga., in the suit brought by the Central Trust Co. of New York to foreclose the first mortgage bonds. These bonds amount to \$350,000, and bear seven per cent. interest, but there has been a default in the payment of the interest for more than a year. The company has outstanding about \$130,000 of six per cent. income bonds, but these are nearly all owned by the Central of Georgia. The road is a narrow gauge line and extends from Augusta to Sandersville, 80 miles.

**Baltimore & Ohio.**—The report of earnings for December on the whole system were \$2,176,155, increase, \$163,208; operating expenses, \$1,572,802, increase, \$116,806; net increase, \$448,402. The earnings and expenses for the three months of the fiscal year 1891-1892 compared with the same months of the previous fiscal year were as follows: On the lines east of the Ohio River, earnings, \$4,092,847, increase, \$103,458; expenses, \$3,434,353, increase, \$204,745; net decrease, \$101,267. On the lines west of the Ohio River the earnings were \$1,600,107, increase, \$155,141; expenses, \$1,290,716, increase, \$87,185; net increase, \$307,050.

A syndicate of New York and London bankers has purchased the entire \$5,000,000 of the common stock of the company, the issue of which was authorized last November. The syndicate is composed of Vermilye & Co., August Belmont & Co., and Kuhn, Loeb & Co., of New York, and Blake, Boissvain & Co., E. Cassel and Robert Fleming, of London. The purchase price is about par. The condition of the sale was that the company should resume the payment of cash dividends of at least five per cent. The first dividend under the agreement will be declared on May 12. The money thus realized will be used by the road in improvements of tracks, stations and rolling stocks, and of the Chicago terminals.

**Charleston, Cincinnati & Chicago.**—Between five and six millions out of the \$7,345,000 of the bonds have now been deposited under the reorganization plan and the committee expects to effect the reorganization so as to take up the work on the uncompleted section. Several meetings of the committee have been held recently but no important business was transacted. The committee consists of John Goldthwaite, of Boston; Samuel Hunt, of Cincinnati; W. K. Blodgett, of Boston; Simon A. Stern, Vice-President of Finance Co., of Pennsylvania, and A. B. Harris, of New York, Secretary. The committee has elected George De B. Keim as the fifth member of the committee.

**Charleston, Sumter & Northern.**—Charles E. Kimball, of New York, has been appointed Receiver of this railroad by the United States Court in Baltimore. Mr. Kimball is president of the road. The receiver was applied for by Alfred A. Howlett, vice-president of the road. The bill alleged that the road is insolvent and unable to pay a judgment of \$25,000 obtained by Mr. Howlett against it for money furnished for operating expenses. The Atlantic Trust Co. of New York, trustee for the mortgage bondholders of the road, consented to the receivership. The receiver will ask for a decree for the sale of the road and the company will be reorganized.

**Chesapeake & Ohio.**—It is proposed to issue new consolidated bonds to an amount large enough to double track a large part of the line, to provide for various other improvements and to retire the present preferred stock and underlying bonds. The preferred stocks are to be exchanged for new bonds on the following basis: Holders of first preferred stock will receive new bonds



to the amount of two-thirds of the par value of the stock, new common stock being issued for the remaining third. Holders of second preferred stock will receive one-third of the par value of their stock in new bonds, and the remaining one-third in new common stock. Arrangements have already been made to dispose of enough of the common stock to give a fund to proceed with the immediate development of the road. The plan as outlined will involve the creation of \$13,000,000 of new common stock.

The company has arranged for the purchase of the Elizabethtown, Lexington & Big Sandy, and will issue its new 4½ per cent. bonds in exchange for the six per cent. bonds of the smaller road. New common stock of the Chesapeake & Ohio will be issued for the certificates of indebtedness and the capital stock of the road will be replaced by shares of the Chesapeake & Ohio at the rate of one share of the stock of that road for two of the Big Sandy Line.

**Columbus, Shawnee & Hocking.**—The following statement has been issued showing the comparative earnings for the last six months of 1890 and 1891:

MONTHS.	1891.	1890.	Inc. or Dec.
July.....	\$56,902	\$26,892	\$30,130
August.....	60,027	32,877	27,150
September.....	57,758	35,770	21,988
October.....	70,179	36,146	34,033
November.....	70,176	34,078	36,098
December.....	71,937	37,976	33,961

Total for six months.....\$387,000 \$203,709 \$183,291  
The increase is 90 per cent. The earnings equal \$775,000 per annum, and about \$325,000 net earnings. The first mortgage interest charges are \$171,250 yearly.

**Grand Trunk.**—Stockholders have been asked to subscribe for \$500,000 perpetual four per cent. consolidated debenture stock at 95½. The proceeds of the issue are for the completion of the St. Clair tunnel, for laying second track and for the purchase of more rolling stock.

**Illinois Central.**—The income from traffic for the five months ending Nov. 30, 1891 and 1890, is shown in the following table:

	1891.	1890.	Inc.
Miles operated.....	2,881	2,875	6
Gross receipts from traffic.....	\$8,341,827	\$7,627,475	\$714,352
Oper. expen. and taxes.....	5,886,987	5,227,282	659,705
Net earnings.....	2,454,840	2,400,193	54,647

The gross receipts from traffic for the month of December, 1891, are estimated at \$1,723,611. For December, 1890, the receipts were \$1,632,736, the estimated increase being \$90,875.

**Lehigh Valley.**—The annual report for the year ending Nov. 30, shows transportation earnings from all sources of \$18,910,200; operating expenses, including rental of leased lines, \$13,075,000, leaving a net revenue of \$5,835,200. Against this there have been charged general expenses of \$723,500, interest on bonds \$2,817,243, and dividends on preferred and common stock amounting to \$2,027,000, leaving \$290,231 to be added to the profit and loss account. The total tonnage was 15,829,741 tons, an increase of 1,399,826 tons over 1890, of which 10,352,954 tons was anthracite, an increase of 1,231,130 tons; bituminous coal and coke, 265,847 tons, a decrease of 120,511 tons, and miscellaneous freight, 5,230,913 tons, an increase of 259,207 tons. The total number of passengers carried in 1891 was 5,734,298, an increase of 542,467. The new line from Geneva to Buffalo and the Geneva & Van Ettenville line, it was reported, would be ready for business by May, when the company's contract with the New York, Lake Erie & Western expires. The expense of building these new roads is met by the issue of 4½ per cent. bonds, amounting to \$4,450,000. The operations of the Lehigh Valley Coal Co. for the year ending Nov. 30, show 1,355,463 tons shipped by the company, against 1,464,503 tons in 1890, and 3,247,622 tons from tenants of the company, against 2,449,502 tons during the previous year.

**Northern Pacific.**—The gross earnings, including the Wisconsin Central, for November were \$2,900,700, a decrease of \$68,357 as compared with the same month of previous year, and net earnings were \$1,470,402, an increase of \$60,788. For the five months ending Nov. 30 the gross earnings were \$14,002,034, a decrease of \$63,354 as compared with the corresponding period of previous year, and net earnings were \$6,455,763, an increase of \$35,928. The fixed charges were \$5,490,968, leaving a balance of \$1,665,484, an increase of \$116,800 over 1890.

**Pittsburgh, Cincinnati, Chicago & St. Louis.**—The statement of the business of the company, including the Little Miami Railroad, for December, 1891, as compared with the same month in 1890, shows increase in gross earnings, \$116,317; increase in expenses, \$204,458; decrease in net earnings, \$88,140. The twelve months of 1891, as compared with the same period of 1890, shows: Decrease in gross earnings, \$551,670; decrease in expenses, \$488,029, and decrease in net earnings, \$60,041.

**St. Louis, Alton & Springfield.**—The foreclosure sale of this road is announced to take place at an early date. The sale is to satisfy the various judgments against the road and end the proceedings which caused the appointment of a receiver in October, 1890. It is said that the line will probably be purchased by the Wabash. It was formerly part of the Wabash, St. Louis & Pacific, but has been operated as an independent line since 1886, when it was released by the receivers of that road.

**South Carolina.**—The reorganization committee, consisting of Frederic P. Olcott, Gustave J. Wetsler, F. S. Smithers, Otto Loewengard and Henry P. Talmage, announce that the deposit of the securities of the company (other than the first mortgage bonds) with the Central Trust Co., of New York, will be received only until Jan. 25. The committee say: "A substantial majority of the second mortgage bonds, under which alone a reorganization appears practicable, as well as a considerable amount of the stock and the income bonds, have already been deposited, and steps are now being taken under the direction of this committee to foreclose the property of the railway company."

**Union Pacific.**—The following statement gives the November earnings of the system and of several of the lines whose earnings are included in those figures:

MONTHS.	1891.	1890.	Inc. or Dec.
Miles operated.....	8,143	8,067	76
Gross earnings.....	\$1,376,433	\$1,102,632	\$273,801
Oper. expenses.....	2,553,108	2,924,040	D. 370,932
Net earnings.....	\$1,823,235	\$1,178,012	I. \$645,223
Eleven mos. to Nov. 30:			
Gross earnings.....	\$40,255,883	\$41,242,230	D. \$986,347
Oper. expenses.....	26,087,887	27,834,519	D. 1,746,632
Net earnings.....	\$14,168,000	\$13,407,711	I. \$760,289

MONTHS.	1891.	1890.	Inc. or Dec.
Miles operated.....	3,956	3,956	0
Gross earnings.....	\$656,123	\$671,697	D. \$15,574
Oper. expenses.....	339,507	470,761	D. 131,254
Net earnings.....	\$316,616	\$200,936	I. \$115,680
Eleven months to Nov. 30:			
Gross earnings.....	\$6,963,060	\$6,881,911	I. \$81,149
Oper. expenses.....	4,200,144	4,535,359	D. 335,215
Net earnings.....	\$2,762,916	\$2,346,551	I. \$416,365

MONTHS.	1891.	1890.	Inc. or Dec.
Miles operated.....	3,956	3,956	0
Gross earnings.....	\$573,305	\$558,550	I. \$14,755
Oper. expenses.....	310,344	380,039	D. 69,695
Net earnings.....	\$262,961	\$178,510	I. \$84,451
Eleven months to Nov. 30:			
Gross earnings.....	\$5,274,528	\$4,469,217	I. \$805,310
Oper. expenses.....	3,452,272	3,592,467	D. 140,195
Net earnings.....	\$1,822,256	\$876,749	I. \$945,507

MONTHS.	1891.	1890.	Inc. or Dec.
Miles operated.....	4,228	4,228	0
Gross earnings.....	\$1,228,724	\$3,983,124	I. \$2,754,400
Oper. expenses.....	2,451,261	2,827,792	D. 376,531
Net earnings.....	\$1,777,467	\$1,155,332	I. \$622,135
Eleven months to Nov. 30:			
Gross earnings.....	\$39,116,364	\$39,852,907	D. \$736,543
Oper. expenses.....	25,164,080	26,683,290	D. 1,519,210
Net earnings.....	\$13,952,284	\$13,169,617	I. \$782,667

**Western Maryland.**—General J. H. Bryant, of New York City, has recently renewed his offers to purchase the capital stock of the Western Maryland owned by the city of Baltimore. This is a renewal of the negotiations which were conducted by General Bryant in April and May of last year. At that time he offered to pay \$1,500,000 for the stock owned by the city, but the city finance committee refused to consider the proposition.

## TRAFFIC.

### Chicago Traffic Matters.

CHICAGO, Jan. 20, 1892.  
Chairman Finley has fined the Rock Island \$300 for selling a ticket at an outside office, the agreement restricting sales to its city ticket office. The charge was made by the Burlington and was in effect that a party called at a broker's office and was offered a ticket to Kansas City for \$10. Upon his accepting the offer the clerk filled out an order, took it to the depot office of the Rock Island, procured the ticket and delivered it to the passenger, subsequently paying a street runner \$1 for directing the passenger to the broker's office. The defense was that the order in question was issued by Johnson & Co., of New York, under a contract, they claiming that their representative in Chicago had no authority to sell it for local passage. The order was dated New York, Oct. 20, and was sold in Chicago Oct. 23. The Rock Island claimed that it had no means of knowing it was not a bona fide order issued in New York by Johnson & Co. on immigrant business, which the agreement allows.

The Western Passenger Association will make a rate of one lowest first-class fare for the round trip from all association points to Minneapolis and return for the Republican National Convention; tickets to be sold June 5, 6 and 7, good for return passage until and including June 25.

The arbitrators in the case of the appeal of the Rock Island from a decision of Chairman Finley adjudging the road guilty of doing a brokerage business, having secured from a broker two tickets disposed of to the broker by an advertising agent who received them on a contract for advertising, have reversed the decision of the Chairman, on the ground that the agreement does not forbid contracts under which tickets are exchanged for advertising. The agreement admits the possibility that such transportation may find its way into brokers' hands and provides for redemption of such tickets as may be so disposed of.

The Central Traffic Association lines are again endeavoring to bring about a change in percentage divisions at junction points with Western roads so as to allow the Eastern lines an increased proportion of the through rates.

J. T. R. McKay has resigned as Chairman of the Freight Committee of the Central Traffic Association, and D. T. McCabe, of the Pittsburgh, Cincinnati, Chicago & St. Louis, has been elected to succeed him.

Agents of the Eastern roads at Omaha are feeling sore because they cannot get any grain which is going to Baltimore, and they appear to think the Burlington is manipulating rates via Beardstown, but no such manipulations can be discovered.

The Illinois Central recently inquired of Chairman Finley whether an arrangement with Thomas Cook & Son to allow them the privilege of ticketing over that line and paying them commissions would be in accord with the agreement of the Western Passenger Association. The Chairman decides that the agreement will not allow such arrangements to be made.

At the regular meeting of the passenger department of the Central Traffic Association, held Jan. 15, it was decided to hold meetings bi-monthly hereafter, instead of monthly.

The meeting of the Freight Committee of the Central Traffic Association last week considered an application for free transportation for contributions to the sufferers in the famine-stricken districts of Russia, and Chairman Blanchard was authorized to act with other associations in securing free shipment of such contributions and in the equitable division of the freight among the various lines.

### Traffic Notes.

The Toledo, St. Louis & Kansas City is negotiating for additional vessels for its lake line between Toledo and Buffalo.

The name of the Colorado Passenger Association has been changed to the Colorado Committee of the Trans-Missouri Passenger Association.

The Kansas State Railroad Commissioners have ordered a reduction in rates on live stock to Wichita from points within 80 miles of that city.

A sleeping car is now run through between Washington, D. C., and Memphis, Tenn., via Atlanta and Birmingham. The time is about 31 hours.

A bill has been proposed in the Massachusetts Legislature compelling the railroads of that state to accept each other's mileage tickets. There is a penalty of \$1 for each coupon refused, and for each case wherein a company refuses to redeem one of its own coupons taken up on another road.

The through-day express between Boston and Wash-

ington via the Shore Line, the steamer "Maryland" and the Pennsylvania road, which was run for some time last year, has again been put on. It leaves Washington at 7:50 a. m. and Boston at 9 a. m., and is called the "Colonial Express."

A Raleigh dispatch states that the North Carolina Railroad Commission has made a decision on passes, adopting the view of the Interstate Commission that it is a violation of the act to give such passes to public officials. It reverses its decision as to the right to give passes to newspapers for advertising.

The disagreement among the transcontinental roads regarding their respective percentages of the subsidy which they pay to the Pacific Mail Steamship Co. has again been under discussion. It appears that the Northern Pacific, receiving the smallest share of the benefit from the pool, makes loud complaints of the expense charged against it. It is said now that the whole question has been referred to arbitrators.

The commercial travelers have renewed their siege at Washington, and have got before the House Committee on Interstate Commerce several bills permitting railroads to give them special rates for tickets and baggage. This committee is said to look favorably on the demands of the drummers, so much so that the chairman has appointed a sub-committee on the matter consisting of Messrs. Rayner, of Maryland; Patterson, of Tennessee; Geary, of California; Storer, of Ohio, and O'Neill, of Pennsylvania.

Railroad Commissioner Hamill, of Colorado, has investigated complaints of the people of Georgetown and Silver Plume concerning rates charged by the Union Pacific on coal and ores, and has notified the road that certain reductions ought to be made; and it is understood that he will issue a tariff, under the provisions of the law, if the road does not comply with his recommendations by Feb. 1. The special interest of the case centres in the fact that although Colorado has had a railroad commissioner several years, nothing has before been done toward regulating rates.

The Missouri Pacific has requested Chairman Roswell Miller to call a meeting of the Advisory Board of the Western Traffic Association to consider the appeals for violation of the articles [cutting rates] which were postponed by the board meeting last week. The Missouri Pacific representatives were dissatisfied at the postponement and threatened to withdraw from the association, but no formal notice to that effect was given, and the request now sent to the Chairman is regarded in many quarters as disingenuous because, to have any authoritative influence on Mr. Miller, it needs the signatures of two other roads, which the Missouri Pacific might easily have secured.

### The Interstate Commerce Commission.

The Commission has decided in the case of W. M. H. MacLeon vs. the Chicago & Northwestern that the action of the road in refusing, after payment of freight and offer of customary switching charges, to switch two carloads of coal to a connecting line for delivery at the coal yards of MacLeon on such line, unless he promised in advance to pay any demurrage charges that might be made, regardless of whether they were just or legally enforceable, was unreasonable, notwithstanding MacLeon had previously refused to pay demurrage on other cars switched to his siding which he had failed to fully unload within the time prescribed by the rule, and the Northwestern by retaining the coal in its possession and demanding such promise from MacLeon as a condition precedent to the performance of its duty as a carrier subjected MacLeon to unlawful prejudice and disadvantage. The Commission decides that MacLeon is entitled to reparation, but, the proof as to the extent of his damage being insufficient, the case will be held open for the present without order, and upon notice of adjustment by the parties concerned the petition will be dismissed.

### THE COXE BROTHERS' CASE.

Judge Acheson, in the United States Circuit Court at Philadelphia last week, in the proceeding brought by the Interstate Commerce Commission against the Lehigh Valley road to enforce its order made in the Cox Brothers & Co. coal freight discrimination suit, filed an opinion which virtually decides that the whole case must be retried in the courts. The road not having complied with the order made by the Interstate Commission, the court was petitioned for an injunction to restrain it from other violation of the order. To this the road filed an answer, denying that the rate charged for transporting coal was unreasonable and unjust, and the matter was argued some weeks ago. The court now decides that, in view of the denials and averments of the answer, the action for an injunction must be denied, but without prejudice to the right of the Interstate Commerce Commission to file a replication. The findings of the Interstate Commerce Commission being only *prima facie* just, when brought before a court, Judge Acheson agrees with the decision in the Kentucky & Indiana Bridge case, and with that in the Cincinnati party-rate ticket suit, in holding that an appeal from the Commission's decision necessitates a new trial.

### Eastbound Shipments.

The shipments of eastbound freight from Chicago by all the lines for the week ending Jan. 16 amounted to 112,086 tons, against 144,545 tons during the preceding week, a decrease of 32,459 tons, and against 74,810 tons during the corresponding week of 1891, an increase of 44,276 tons. The proportions carried by each road were:

Roads.	Wk. to Jan. 16.		Wk. to Jan. 9.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central.....	16,293	13.7	21,387	15.9
Wabash.....	6,799	5.7	7,230	5.9
Lake Shore & Michigan South.....	23,784	19.1	31,231	21.6
Pitts., Ft. Wayne & Chicago.....	18,413	15.5	18,688	12.9
Pitts., Cin., Chicago & St. L.....	13,136	11.0	13,342	9.3
Baltimore & Ohio.....	7,955	6.7	10,695	7.3
Chicago & Grand Trunk.....	11,015	9.3	17,671	12.2
New York, Chic. & St. Louis.....	12,076	10.1	11,430	7.9
Chicago & Erie.....	10,635	8.9	12,636	8.8
Total.....	119,086	100.0	144,545	100.0

Of the above shipments 14,562 tons were flour, 66,309 tons grain, 5,146 tons millstuffs, 6,237 tons cured meats, 9,892 tons dressed beef, 1,242 tons hides and 3,239 tons lumber. The three Vanderbilt lines carried 12.9 per cent. of all the business, and the two Pennsylvania lines 26.5 per cent.



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The best results are obtained in freight train braking from having all the cars in a train fitted with power brakes, but several years' experience has proven conclusively that brakes can be successfully and profitably used on freight trains where but a portion of the cars are so equipped. Below is a graphical illustration of the progress made in the application of the Automatic Brake to freight cars since its inception

Year.	No. per year.		Grand total.
1881	105	■	105
1882	1,085	■	1,190
1883	4,966	■	6,156
1884	15,051	■	21,207
1885	10,410	■	31,617
1886	8,946	■	40,563
1887	9,281	■	49,844
1888	27,696	■	77,540
1889	26,065	■	103,605
1890	50,502	■	154,107

154,107 freight cars fitted with the Westinghouse Automatic Brake, which is more than 15 per cent. of the Entire Freight Car Equipment of this country.

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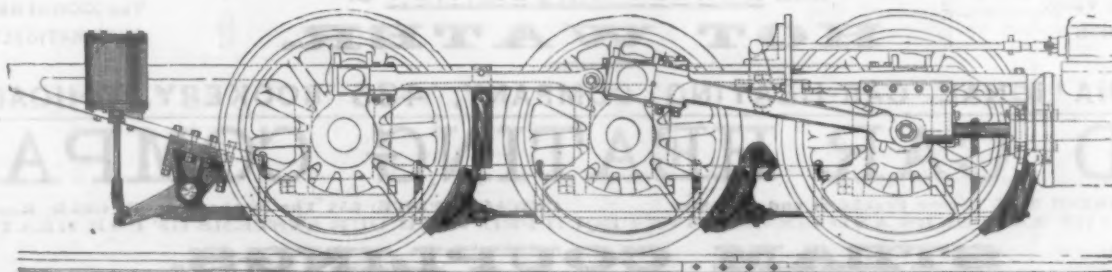
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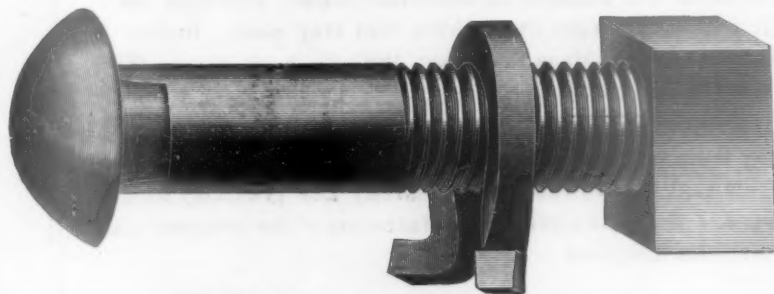
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SAMPLES FREE.

This nut lock is presented on its merits as the best and cheapest device for securing track joints.

It is a torsional loop made of good quality of tempered spring steel, having horizontally inclined foot pieces, which are curved inward, thereby greatly increasing the spring resistance and acting simultaneously; rests upon the base of angle bar, or underlying rail base in case of fish plate, preventing the loop portion from rotating and hammering down ahead of bolt.

The nut lock for  $\frac{1}{4}$  bolt made of  $\frac{1}{4}$  in. square steel, standard pattern, yields a tension of 4,300 lbs. on the bolt, which is sufficient to reduce the wear of the bearing surfaces of the angle bar on the rails, imparting, as it does, a uniform bearing the entire length of the bar.

The "Standard" Nut Lock has sufficient elasticity to maintain a tight joint, which cannot be truthfully said of many light-weight single coil washers.

The "Standard" Nut Lock is, in its superficial form, similar to an annular coil twisted out of plain, i. e., the curved shoulders or ends of the loop proper are spread in the usual manner of spring coils, at which bearing points the locking friction is equal to that of the best single coil washer, and added to this it is terminated in inwardly curved extensions, which must apparently furnish additional short leverage spring force of a torsional character.

**Distinctive Merits of the "Standard" Nut Lock, Condensed:**

Fixedness of position—cannot rotate and hammer down threads of bolt.

Cannot get one end into elongated slot of angle-bar.

Unlike any permanently placed, double washer, the Standard is interchangeable regardless of distance between bolts.

Cannot be put on wrong side out, as the outward projection of the foot pieces would prevent the nut being turned up.

Has more spring power directly under the nut than any two ordinary coil nut locks.

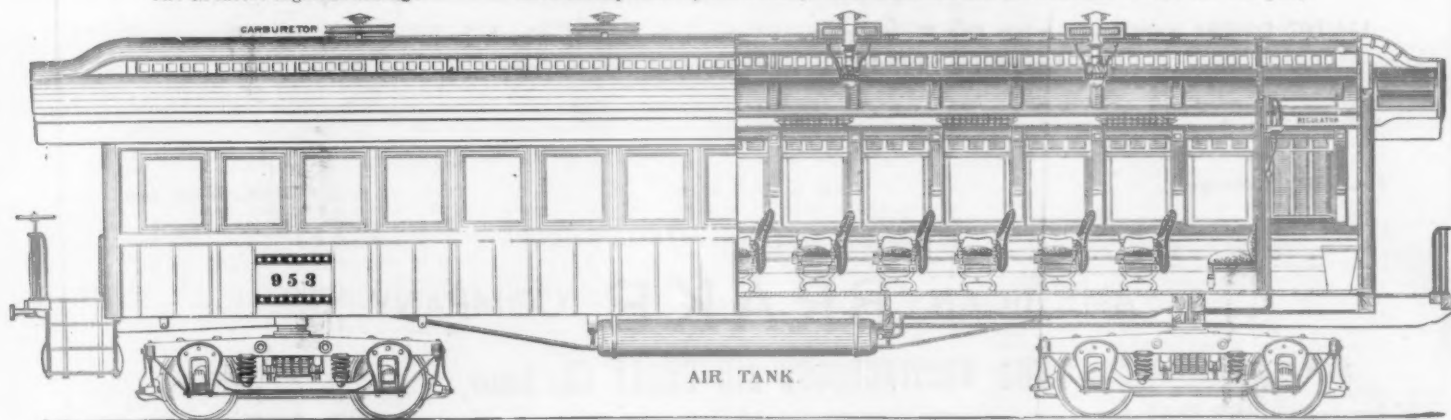
Being fixed in position, it offers double the locking friction of nut locks, which when in their dead "set" condition turn back with nut by the vibrative effect of passing train.

The "Standard" Nut Lock embodies the old principle of spring power improved by overcoming the objection to the double washer or nut lock, and covering the weak points of the single coil washer.

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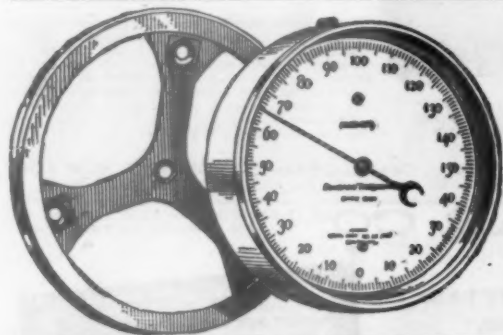
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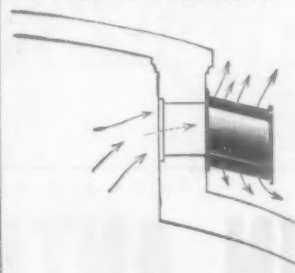
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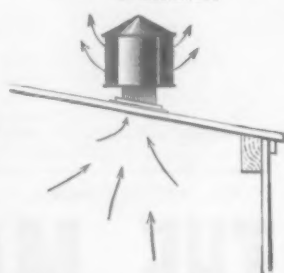
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The drooping form, Passenger  
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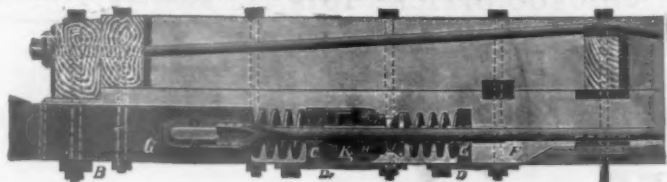
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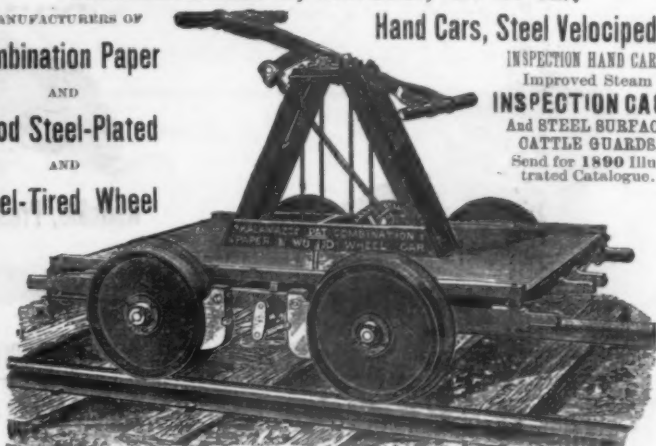
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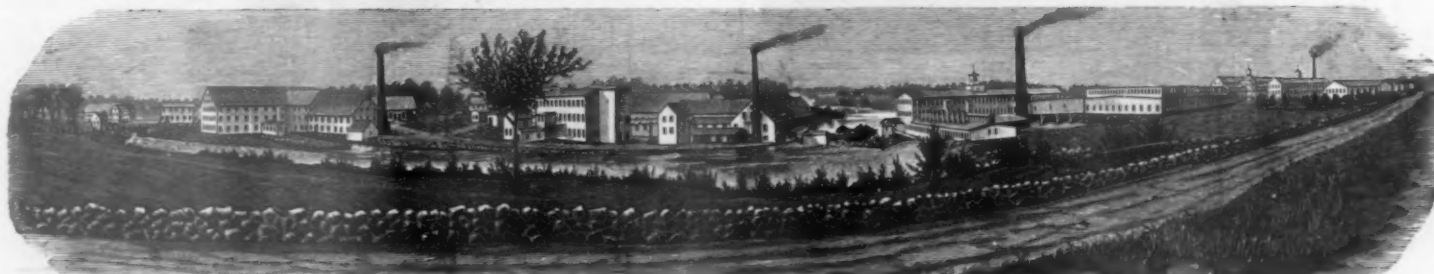
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Drawhead, Malleable Iron.



Knuckle, Pressed Steel.



Pin, Drop Forged Steel.

THREE PARTS.

With Chain Attachment for Opening  
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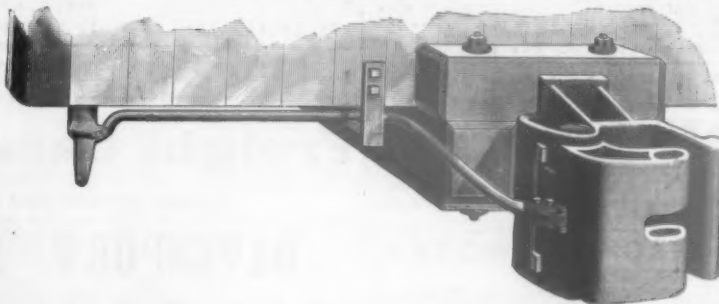
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Knuckle Is Pulled Open from  
Side of Car by Continuation of  
Same Movement of Lever Which  
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Drawbar Cannot Fall on Track in  
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Rod Pulls Up Against Stirrup.  
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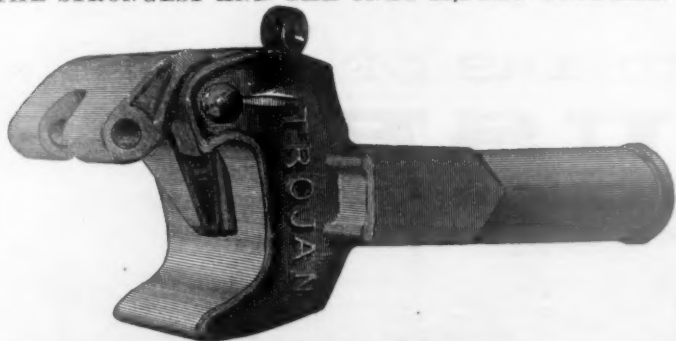
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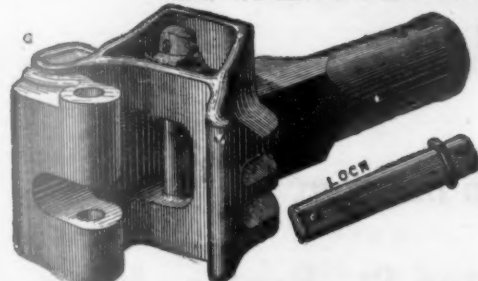


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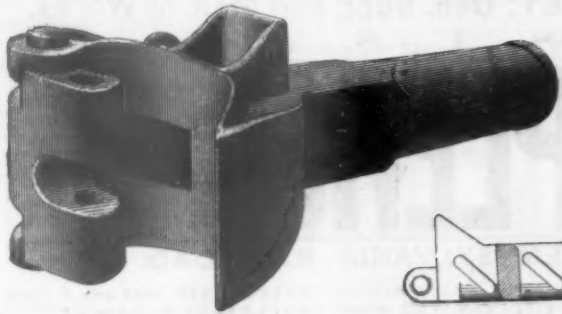
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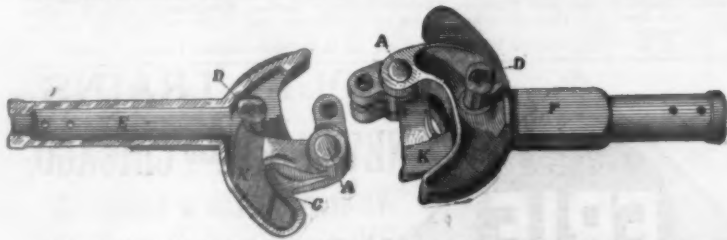


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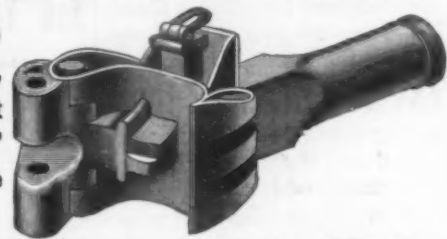
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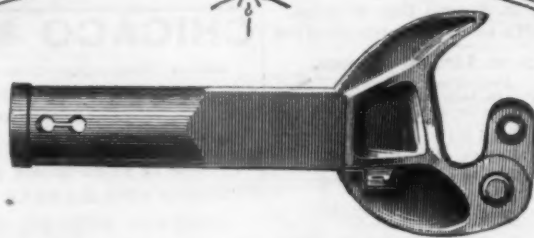
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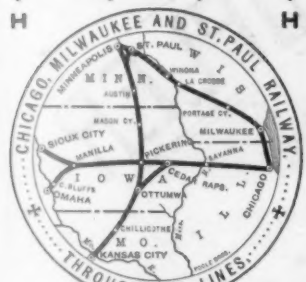
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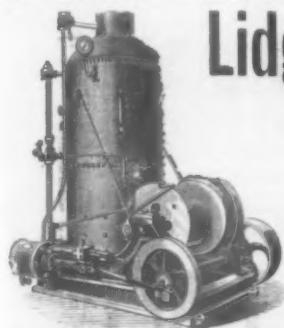
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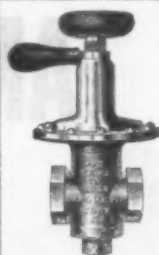


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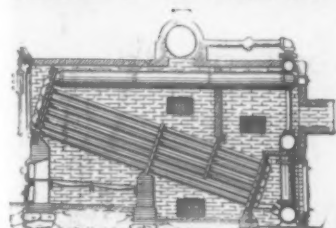
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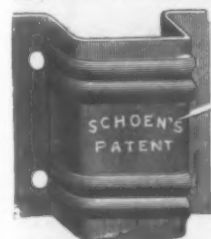
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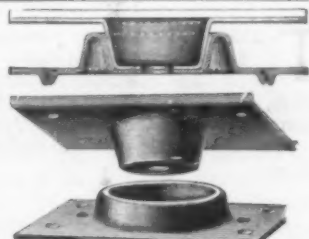
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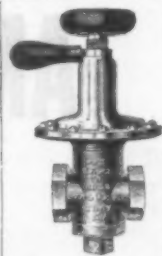
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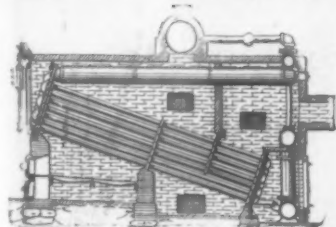
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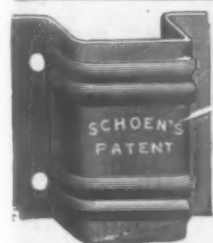
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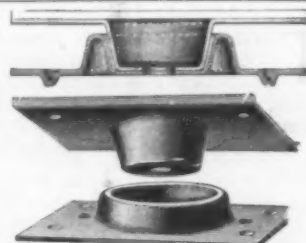
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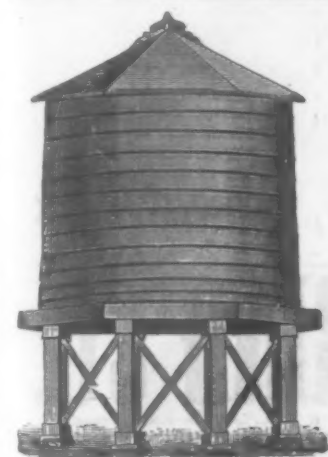
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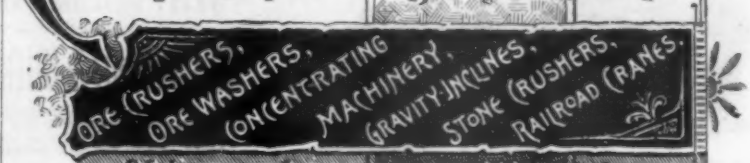
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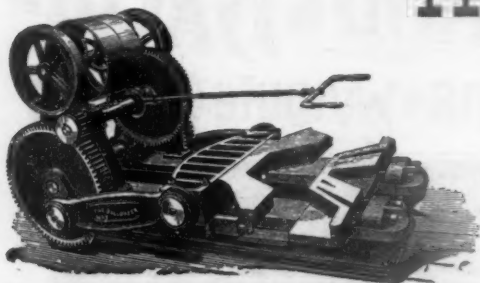
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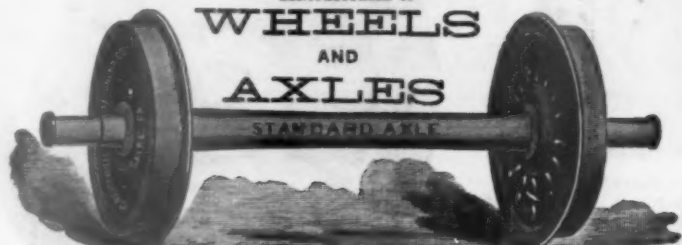
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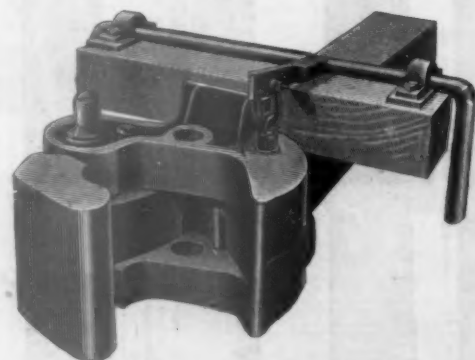
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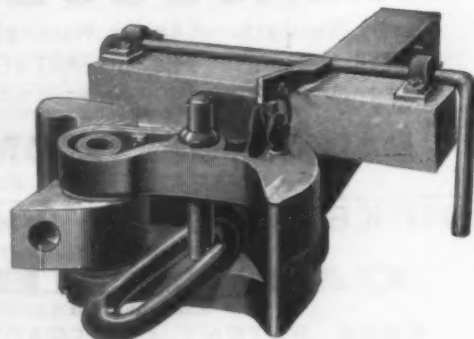


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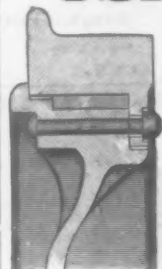


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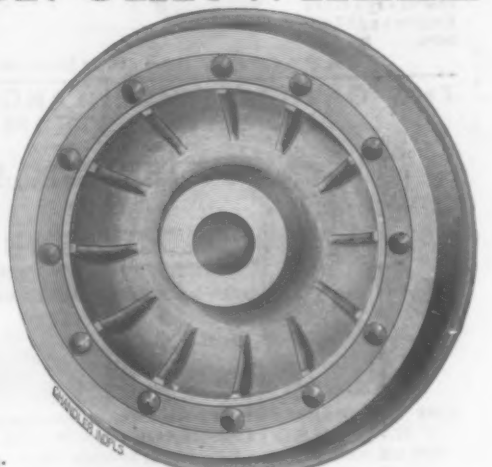
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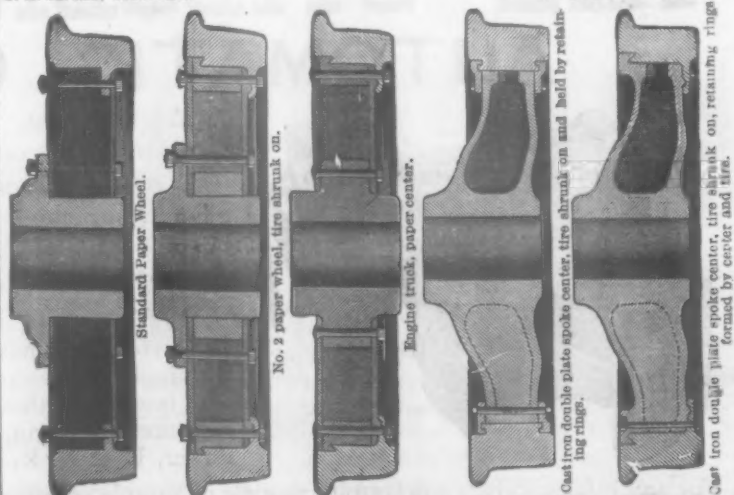
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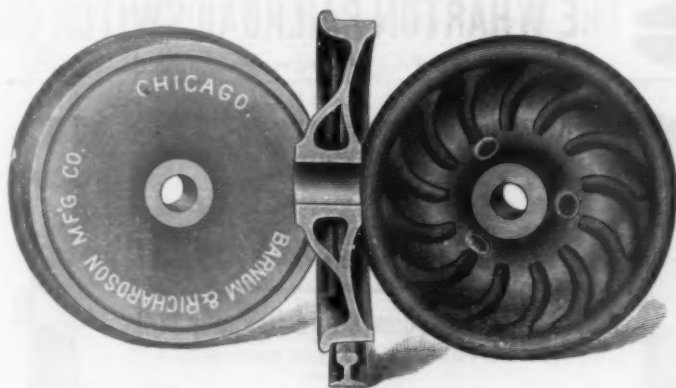
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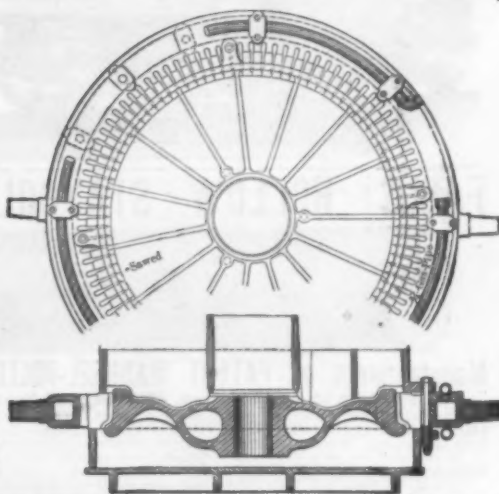
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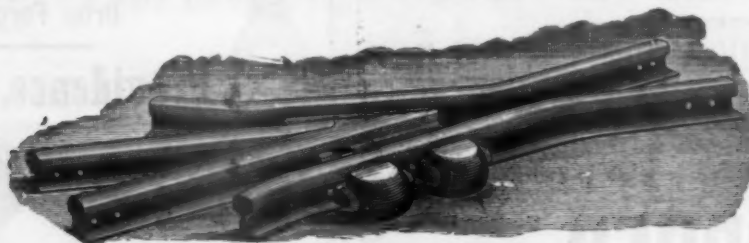
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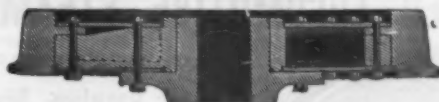
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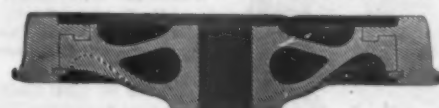
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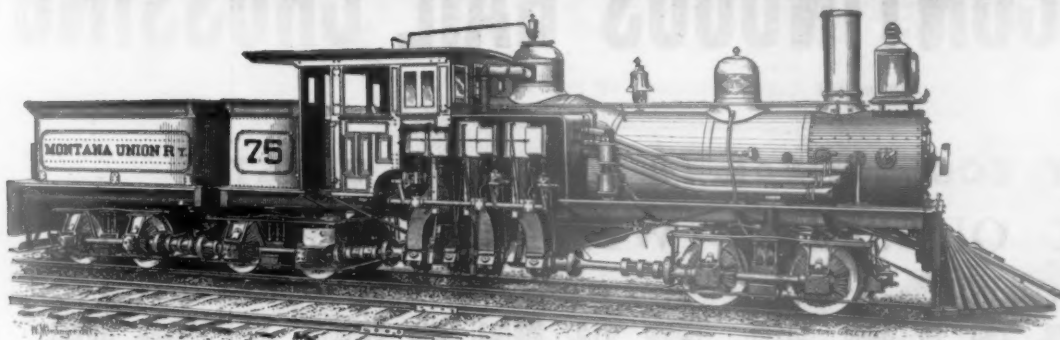
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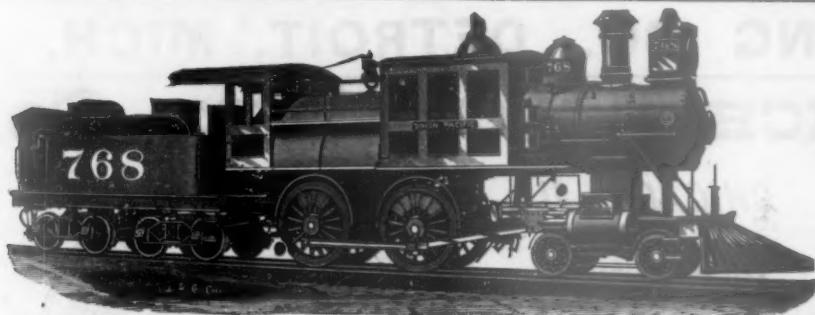
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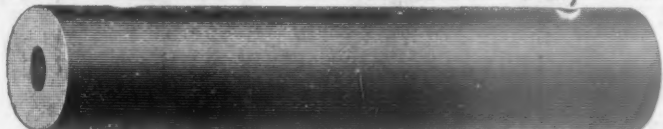
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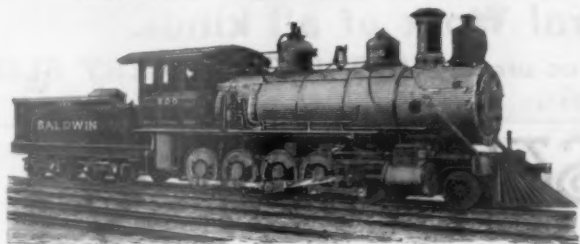
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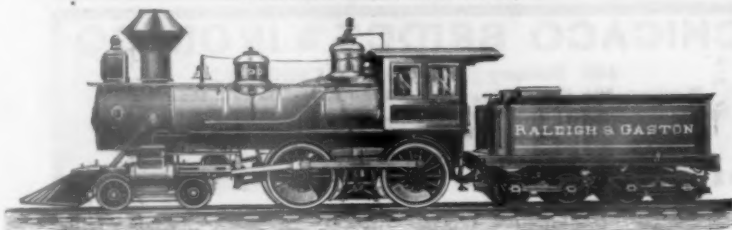
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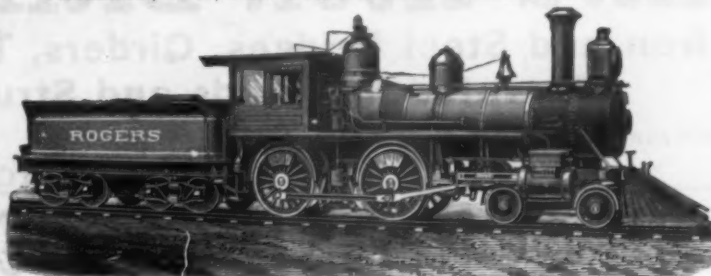
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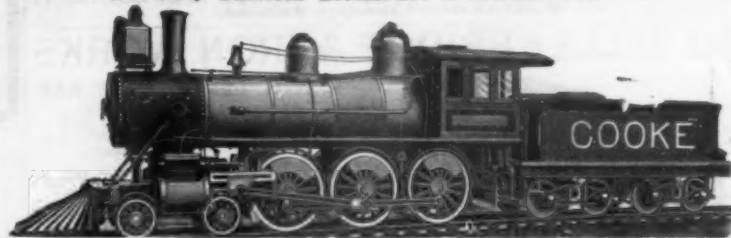
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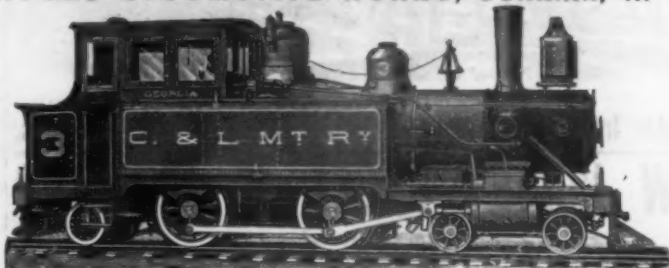
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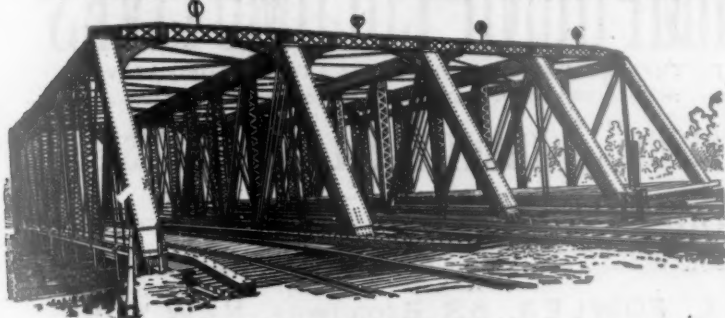
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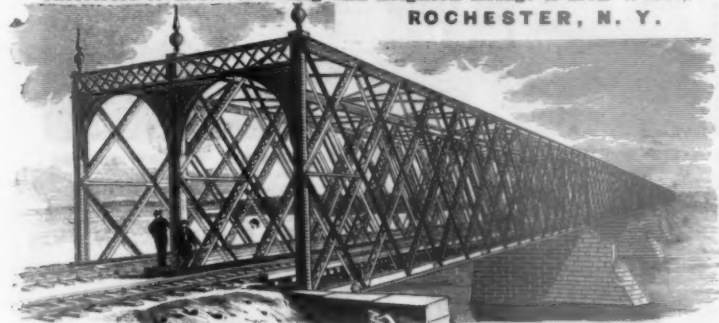


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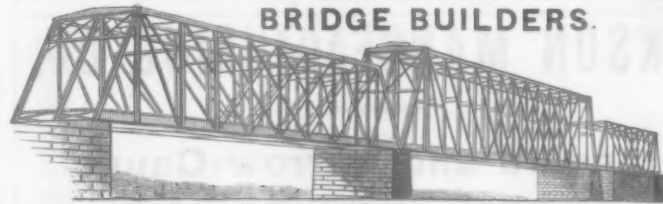
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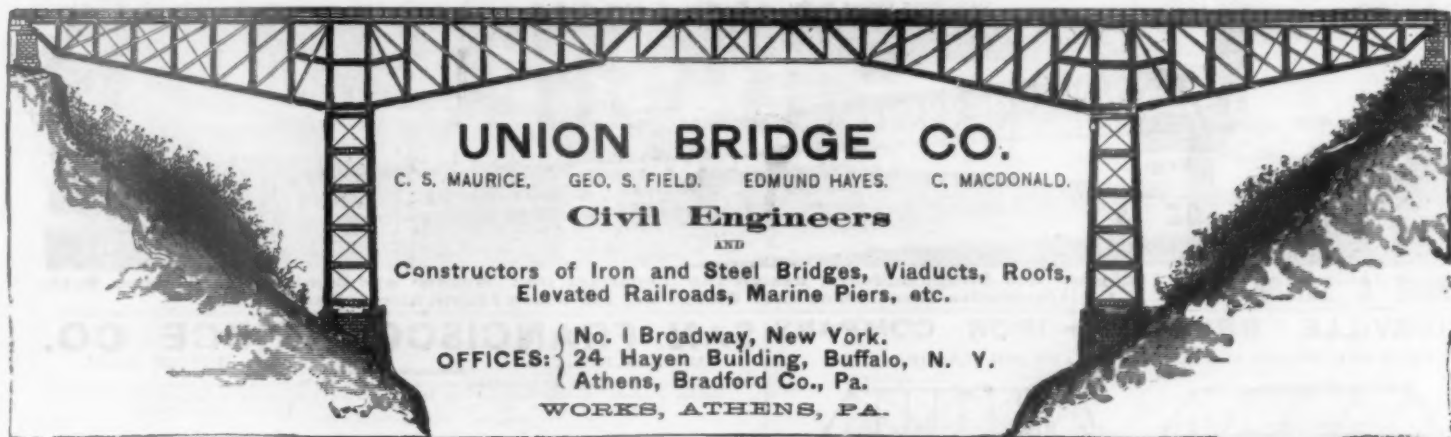
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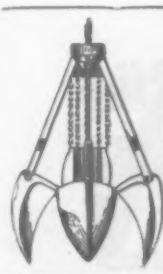
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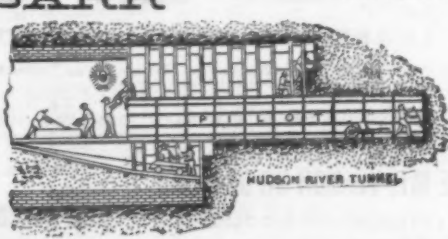
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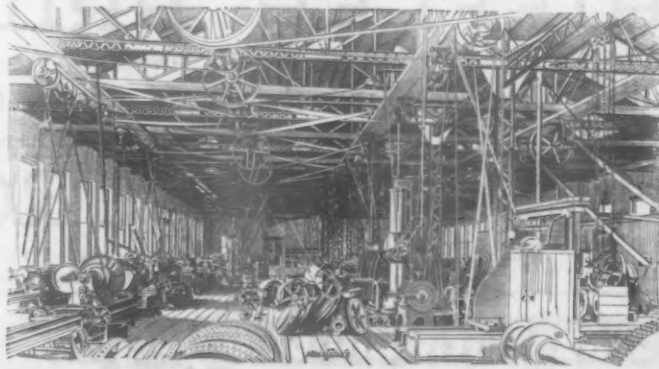
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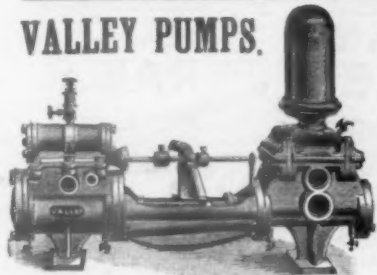
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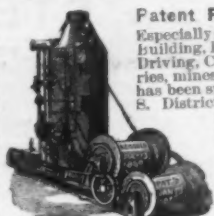
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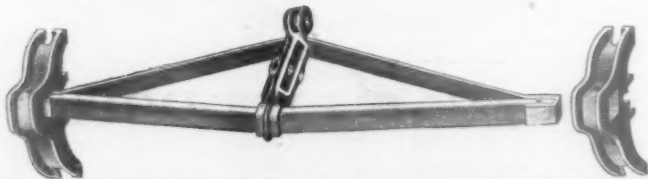
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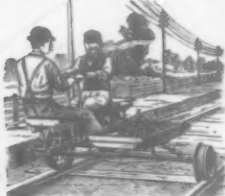


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